(ISO 9001:2015 Certified)

B.DES_INTERACTION DESIGN

(w.e.f. 2023)

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UPES

UNIVERSITY OF TOMORROW

School of Design

Interaction Design

Course book, 2023

Bachelor of Design

Interaction Design

Interaction design is a process in which designers focus on creating engaging web interfaces with logical and thought out behaviors and actions. Successful interactive design uses technology and principles of good communication to create desired user experiences.

The practice of interaction design has been started long back in the field of human computer interaction. The interaction design focuses on information and navigation design, system design, interaction design, user interface design, cognitive ergonomics and user behavioral modeling.

Intent

Interaction design programme is intended to create creative mindset of students who have knowledge of information and navigation design, system design, interaction design, user interface design and user behavioral modeling.

Students will be nurtured for the entrepreneurial skill and business attitude along with empathy for either client or target consumers. Students shall serve as user experience designers, user interface designers, interaction designers, service experience designers, and UX architect at the end of this course.

POs / Program Outcomes

PO 1:
Develop a Creative Mind-set
Develop the ability to think out of the box and come up with alternative solutions for every problem. Prepare the mind for the unexpected and develop the ability to explore the unknown

PO 2:
Empathy
Develop the empathy towards end users, which will help arrive at solutions that have a long- term benefit for them.

PO 3:
Creative Articulation
Develop the ability to articulate and communicate ideas and concepts verbally, through visual representation and through writing

PO 4:
Discovery to Realization
Develop a strong process oriented mind-set and the ability to identify Insights ranging from small incremental changes to undiscovered value additions for both the end consumer and all stakeholders

PO 5: Design for Future
Develop the ability to harness the technologies of the future and create design solutions to that enhance the lives of people.

PO 6: Multidisciplinary Approach
Inculcate a multidisciplinary mindset that brings a holistic approach towards the overall design process and helps deliver a cohesive outcome.

PO 7: Entrepreneurial Spirit

Develop the ability to think innovatively, take risks, develop and successfully commercialize solutions in evolving market conditions

PO 8: Teamwork

Demonstrate knowledge and understanding of the design principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 9: Professional Ethics

Apply ethical principles and commit to professional ethics, responsibilities and norms of the design practice.

PO 10: Sustainable Solutions

Understand the impact of design in the societal and environmental contexts, and demonstrate the knowledge of, and ability to come up with sustainable solutions.

PO 11: Local & Global Context

To demonstrate the knowledge and sensitivity towards local needs and come up with solutions that contribute towards nation building while achieving international quality and benchmarks.

PO 12: Lifelong learning

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSOs / Program Specific Outcomes

PSO1 - *Cognitive Ergonomics and User Behavior Modeling:* Student will learn various types of user research (both the qualitative and quantitative) to understand the cognitive, emotional and behavioral aspects of user and to define user requirements. Students will improve their research and analytical skills through user research based interaction and interface design projects. Students will be able to develop user behavioral models.

PSO2 - *Information and System Design:* Student should be able to categorize a large chunk of information in a meaningful way to make the system more user friendly. Student will

also have better understanding of information design and the fitting the required information to pursue certain action/task.

PSO3 - *Interaction and Navigation Design:* Student will learn various types of interactions for different digital (software and hardware) platforms. Student will be able to implement certain interaction type as per the user behavior for better user experience. They will also learn various tools and techniques of interaction design.

PSO4 - *User Interface Design:* Student will learn strategies of graphical user interface (GUI), VR Interface Design, AR interface and tangible interface design (TID). Students will be able to apply and develop interface design guidelines. They will learn different tools and techniques of digital interface design.

Foundation program course grid over view

Foundation Year 1, Semester 1

Hours

Sl. No.	Course Code	Course Name	C	L	T	P

1	SDCS 1014	Sketching Drawing 1	5	4	0	2	
2	SDCS 1026	Elements of Design	3	1	1	2	
3	SDCS 1027	Colour	4	1	2	2	
4	SDCS 1028	Geometry	5	2	2	2	
5	SDCS 1018	SLA	2	1	1	0	
6	SDCS 1006	Material Exploration I	2	1	0	2	
7	SLLS 0102	Learning how to learn	2	2	0	0	
8	SLLS 0101	Living Conversations	2	2	0	0	
			25	**14**	**6**	**10**	**30**

Foundation Year 1, Semester 2

Sl. No.	Course Code	Course Name	C	L	T	P	
1	SDCS 1019	Sketching Drawing 2	5	4	0	2	
2	SDCS 1020	Principles of Design	5	1	3	2	
3	SDCS 1021	Design Process	6	3	2	2	
4	SDCS 1010	Material Exploration II	2	1	0	2	
5	SDCS 1023	Computer Applications	2	1	0	2	
6	SLLS 0103	Leadership and Teamwork	2	2	0	0	
7	SLSG 0101	Critical Thinking and Writing	3	3	0	0	
			25	**15**	**5**	**10**	**30**

Year 2, Semester 3

This year's semesters program's intensive curriculum is to devoted and build basic bricks for visualization, with core courses as developing skills for drawing, space and time with movement, with communication perspective, the courses in life drawing, sequence drawing, color and design, Fundamentals of animation in traditional and unconventional experimental animation styles and mediums explorations, along with required skills.

Semester 3, Course grid with CLTP allocation

SL. No.	Course Name		C	L	T	P
1	SDIN 2001	User Centred Design Process	3	1	2	0
2	SDIN 2002	Fundamentals of Interaction Design	3	2	1	0
3	SDIN 2003	Cognitive Ergonomics-I: Fundamentals and Practices	2	1	0	2
4	SDIN 2004	Principles of Information Design	3	1	2	0
5		Open Elective 1	3	1	1	2
6	SLLS 0201	Design Thinking	2	1	1	0
7	SLSG	Ethical Leadership in the 21st Century (Human Values and Ethics)	3	1	2	0

	0201						
8	SDPJ 2109	Project 1: Simple Interaction Design	6	0	3	6	
			25	**8**	**12**	**10**	**30**

Year 2, Semester 4

This year's 4th semesters program's intensive curriculum is to develop yet again the core skills. To attain the knowledge and skills with one could create a narrative write stories and depicting the same with fluid drawings, skills to portrait visualization. Along with in-depth studies of traditional animation tools and understanding of timing for animation.

Semester 4, Course grid with CLTP allocation

SL. No.	Course Codes	Course Name	C	L	T	P	
1	SDIN 2005	Visual Interface Design: Aesthetics Principles in UI Design	3	1	1	2	
2	SDIN 2006	Cognitive Ergonomics-II: Tools & Techniques	2	1	1	0	
3	SDIN 2007	Task Analysis & System Modelling	2	1	1	0	
4	SDIN 2008	Prototyping of User Interfaces	4	2	2	0	
5		Open elective 2	3	0	3	0	
6	SDPJ 2114	Project 2: Multimodal System and Interface Design	6	0	2	8	
7	SLLS 0202	Working With Data	2	1	1	0	
8	SLSG 0202	Environment and Sustainability - Himalaya Fellowship	3	2	1	0	
			25	**8**	**12**	**10**	**30**

Year 3, Semester 5

The Third year takes the work and understanding of details of interface design including notification and dialog design, application of machine learning in interface design. In this semester, students will also learn business planning and they will nurture the entrepreneurial spirit. At the end of this semester, they will pursue a semester project which is choice based.

Semester 5, Course grid with CLTP allocation

SL. No.	Course Name	C	L	T	P
1	Notification and Dialogs Design	2	1	1	0
2	UI Guidelines and its Applications	2	0	1	2
3	Machine Learning for Designers	2	0	1	2
4	Professional Elective 1	3	1	2	0
5	Open elective 3	3	0	1	4
6	Project 3: Professional Elective 2	6	0	2	8
7	Venture Ideation	2	0	0	4

30

Year 3, Semester 6

The 6th semester of this programme is composed of building skill on evaluation of different types of user interfaces. Students will explore a project on innovative technology and design such as VR, AR etc. They need to prepare a portfolio that will help them to get internship in the industry.

Semester 6, Course grid with CLTP allocation

SL. No.	Course Name	C	L	T	P
1	Usability Engineering and User Testing	3	1	2	0
2	Portfolio Creation and Presentation Skills II	3	0	2	2
3	Professional Elective-3	3	1	1	2
4	Open elective 4	3	0	1	4

5	Open elective 5	3	1	1	2
6	Project 4: Immersive Interface Design	6	0	3	6
7	Industrial visit	1	1	0	0

30

Year 4, Semester 7

In the semester 7, acquired students typically move to the advanced level and working in a group and team. They will get a chance to lead the team, applying all the learnings and experience along last 3 years in a form of minor project. Along with these, they will have an opportunity to explore and get an exposure to industry/ academia (out of the country) by commencing a short internship.

Semester 7, Course grid with CLTP allocation

SL. No.	Course Name	C	L	T	P
1	Design Management	3	3	0	0
2	Photography	1	0	1	0
3	Professional Elective-4	3	1	2	0
4	Professional Elective-5	3	0	2	2
5	Open elective 6	3	1	1	2
6	Project 5: Minor Project (As per student interest)	6	0	1	10
7	Summer Internship/ International Exchange	2	0	0	4

3

Year 4, Semester 8

The semester 8 is one of the most important semesters in terms of final project outcomes, which would reflect the UI design ability and understanding of the information, communication and interaction design using all the skills acquired during three and half years. During the program of their studies. students develop a professional-caliber portfolio thru their film projects here at UPES.

Semester 3, Course grid with CLTP allocation

SL. No.	Course Name	C	L	T	P
1	Graduation Project	15	0	0	30

List of Electives:

Program electives

Professional Elective 1:
- A. User Data Analytics and User Modelling
- B. Research Methods and Statistics in Design)

Professional Elective 2:
- A. Designing Interactive systems for Social Needs
- B. Design for Special Need

Professional Elective 3:
- A. Semiotics of Digital Interfaces
- B. Design Semantics

Professional Elective-4:
- A. Instructional System Design
- B. Instructions Design for Digital Products

Professional Elective-5:
- A. Inclusive Design

Open electives

Open Elective-1:
- A. Creativity, Innovation, & Foresight (Online)
- B. Principles of Creativity and Innovation

Open Elective-2:
- A. Design Anthropology: Humanizing Technology for Society
- B. Product and Market Research (Online)

Open Elective-3:
- A. Service Experience Design
- B. Establishing and Cultivating Customer Markets (Online)

Open Elective-4:
- A. Storytelling with Data: Visualization and Communication (Online)
- B. Infographics

Open Elective-5:
- A. Tangible Interface Design

B. Designing Interface for Infotainment System

B. Economic Decision Making (Online)

Open Elective-6:

A. Personalised and Adaptive Interfaces
B. Health Education & Communication

Pedagogy and Evaluation Methodology

Internal:

For Lecture Component:

• *Presentations:* written exam, written assignment (time bound in studio), skill test, written essay & oral test

• *Audio-Visual:* written exam, written assignment (time bound in studio), skill test

• Experience share: written assignment (time bound in studio), skill test, written essay & oral test

• *Case studies:* written analysis of presented case studies

• *Project briefing:* written assignment (time bound in studio), skill test, written essay & oral test, written analysis of presented case studies

• *Assignment context explanation:* deriving written inferences & methodology on presented assignment context

• *Theory & Principles:* written exam, written assignment (time bound in studio), written essay & oral test

For Tutorial Component:

• *Demonstrations:* skill test with studio skill assessment

• *Explanation of assignment approach and process:* submission of proposed methodology

• *Group discussions:* deriving written inferences & methodology on presented assignment context

• *Group briefing:* deriving written inferences & methodology on presented assignment context

• *Citing relevance of assignments through demonstration:* skill test with cognitive & studio skill assessment

• *Analysis technique demonstration:* skill test with studio skill assessment

• *Process Demonstrations:* skill test with cognitive &studio skill assessment

For Practical Component:

• *Practice for refining skills:* skill test with cognitive, studio & innovative skill assessment

• *Iterations and alternative concept generation:* cognitive, studio & innovative skill assessment

• *Execution of idea:* cognitive, studio & innovative skill assessment

• *Implementation of project idea:* cognitive, studio & innovative skill assessment

• *Surveys & recording:* cognitive & studio skill assessment

- *Developing understanding by iterations:* cognitive, studio & innovative skill assessment
- *Design Projects:* cognitive, studio & innovative skill assessment
- *Workshop skills:* studio & innovative skill assessment
- *Prototyping:* studio & innovative skill assessment
- *Model making:* studio & innovative skill assessment
- *Brain storming:* cognitive & innovative skill assessment
- *Documentation:* cognitive, studio & innovative skill assessment

***** All of the teaching pedagogy and its corresponding evaluation methods shall be kept as per the requirement of the course and the course faculty is solely responsible for selection of teaching pedagogy and shall adapt the suggested evaluation methods as listed above.**

End-Semester Examination:

Jury:

- A panel of jury members will be formed with at least three members (one subject matter expert specific to the design programme, one internal design faculty member and one industry expert/ another internal design faculty member).
- Jury panel will evaluate all the course outcomes based on evaluation criteria (Cognitive skill, Studio Skill, and Innovative Skill). The jury panel will assign the both quantitative markings and qualitative feedbacks in a prescribed format. Feedbacks for each course will be recorded in a prescribed format.

Criteria of Assessment and its Definition:

- **Cognitive skill (CS)-** The CS are related to understanding of a particular subject in the design programme
- **Studio Skill (SK) –** The SS are related to quality of modeling/ illustration / digital representation skill of a student during studio practice for respective design problem
- **Innovative Skill (IS) -** Innovative skills are related to the quality of a student to bring unique creative solutions to an assigned design problem to a particular context.
- **Attitude Towards Learning (ATL) –** This is depending on the frequency of faculty-student interaction, which could be measured as number of classroom attendance and one to one meeting of student with a faculty, for assignment guidance required by a student.

*****Weightage (from 10 % to 100%) could be assigned for these above mention criteria (CS, SS, IS and ATL) as per the requirement of evaluation of a particular course. However, a maximum weightage for ATL should be kept as 10 %.**

Foundation

Year 1

Semester 1

2023-27

SKETCHING AND DRAWING-I

Foundation @ SOD

L	T	P	C
4	0	2	5

COURSE BRIEF

Drawing is a language /tool which helps design students represent their concept and ideas. Since primitive age, drawing was a best way of communicating thought or Idea. Ability to use lines and draw is a basic requirement of design practice. This module introduces students to the essentials of freehand drawing and enables them to draw what the eye observes, and the mind perceives. They are guided on how to use drawing as a powerful communication tool and about coordination of hand, eye and mind.

LEARNING OBJECTIVES

The module introduces the students to

- The fundamentals of Visual Perception and Spatial Positioning of Figures/ Objects in two dimensions and three dimensions
- Observe and represent observation with different lines.
- Develop line quality with rigorous sketching.

COURSE CONTENTS

- **Drawing basics:**

  Types of pencils and their characteristics, how to hold a pencil, importance of wrist and elbow movements, how to draw lines and circles, importance of drawing in single strokes, disadvantages of broken wrist movement, gain control over eye and hand coordination.

➢ Nature Drawing :

Importance of pressure while drawing a line. Impact of variation in pressure on the quality of drawing. Understand basic units, (e.g. a leaf) their proportions and relationship with the whole. Draw simple units, without details.

➢ Human Drawing:

Understand the proportions of body. Different parts of human body, their proportional relationship within and without, learn to draw parts without details.

➢ Object Drawing:

Basic dimensions, how three dimensions build up volumes, representation of three axes in 2 D, principles of isometric and perspective drawing, simple isometric and perspective drawing in one, and two point perspectives.

COURSE OUTCOMES

Knowledge & Understanding:

After completing this course, you will be able to:

- CO1: Develop observation skills and understanding of tools to draw
- CO2: Understand proportions of human body and objects and their relationship to the environment

Skills and Attributes:

- CO3: Apply observational skills to draw nature, human and object drawings
- CO4: Sketch forms and figures with an understanding of proportions, light and shade, angles and perspective

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning

CO 1	2	1	3	2	3	3	0	0	0	0	3	3
CO 2	2	2	3	2	3	2	0	0	0	1	1	3
CO 3	3	2	3	3	3	2	0	0	0	2	2	3
CO4	3	1	3	3	3	2	0	0	2	2	2	3

PREREQUSITES AND MATERIAL

1. Basic drawing skill
2. Pencil (2B , 4 B, 6B) Paper (cartridge paper, color , and other types of paper)
3. Require few objects and human models for Live sketching

REFERENCE BOOKS

1. Sketching: Drawing Techniques for Product Designers by Koos Eissen(Author), Roselien Steur(Author), BIS Publishers
2. Drawing for Product Designers (Portfolio Skills: Product Design) by Kevin Henry, Laurence King Publishing
3. Perspective and Sketching for Designers by Jessica Newman, Jessica Newman and Jack Beduhn, Prentice Hall
4. Freehand Drawing For Architects and Interior Designers by Magali Delgado Yanes, Magali Delgado Yanes (Author), Ernest Redondo Dominguez and Maria Fleming Alvarez, W. W. Norton & Company
5. Design Drawing by Francis D. K. Ching and Steven P. Juroszek, Wiley
6. How to Draw: drawing and sketching objects and environments from your imagination by Scott Robertson and Thomas Bertling, Design Studio Press
7. Sketching: The Basics by Roselien Steur an Koos Eissen, BIS Publishers
8. Anatomy and Drawing by Victor Perard, Dover Publications
9. Illustration With Markers/Time-Saving Techniques for Design Professionals by John A. Gleason, Whitney Library of Design
10. Rendering with Pen and Ink by Robert W. Gill, W Norton & Co Inc

URL

- https://www.creativebloq.com/features/how-to-draw-animals-people-landscapes
- https://design.tutsplus.com/tutorials/how-to-draw-a-rose--cms-26864
- https://www.thegreatcourses.com/courses/how-to-draw.html
- http://www.floobynooby.com/pdfs/Perspective_Drawing_Handbook-JosephDAmelio.pdf
- https://www.pdfdrive.com/human-figure-drawing-books.html

ELEMENTS OF DESIGN

Foundation @ SOD

L	T	P	C
1	1	2	3

COURSE BRIEF

The elements of design are the basic components used as part of any composition. They are the objects to be arranged, the constituent parts used to create the composition itself. In most situations, the elements of design build upon one another, the former element helping to create the latter. The module focuses on ways of thinking and seeing with focus on the elements like a dot, a line, color, shape, form, texture, pattern etc.

LEARNING OBJECTIVE

The module introduces the students to

- Understand fundamentals related to elements of design and develop sensitivity towards Visual Perception.
- The various characteristics of each element and their applicability.
- Explore according to aptitude and thought process. Such explorations imbibe sensitivity towards the various characters of each element and the variations that can be created by appropriate utilization of these characteristics.

COURSE CONTENT

- **Dot**

What is a dot? Arrangement of dots, image creation with dots, density of dots, impact of varying densities of dots, relationship of density with clarity of pictures/images,

- **Line**

Line as extension of dots, straight and curved lines, various attributes of line, (width, thickness, weight, length, direction) combination of various types of lines, effect of line orientations

- **Texture and pattern**

What is texture? Texture and pattern in nature and man-made environment, analysis of texture and patterns, exploration with different media

- **Shape**

Definition/ identification of shape, (through lines, value, color, texture etc.) Geometric and organic shapes. Linear and complex shapes. Interaction of shapes

- **Size/scale**

Basic understanding of scale and size. How sizes play a role in gaining/losing dominance over other elements in a given format.

- **Form and space**

Definition of negative and positive spaces. Relationship between positive and negative spaces. Transition from space to form and vice versa.

COURSE OUTCOME

Knowledge & Understanding:

After completing this course, you will be able to:

- CO1: Develop creative conceptual ability and sensitivity to visual perception
- CO2: Understand fundamentals of visual interactions that exist between two or more elements

Skills and Attributes:

- CO3: Apply understanding of elements to create effective compositions
- CO4: Demonstrate an ability to present creative ideas using design language

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	1	3	2	2	2	0	0	2	2	2	3
CO 2	2	1	3	2	2	2	0	0	0	1	2	3
CO 3	3	1	3	2	2	2	0	0	3	2	2	3
CO4	3	2	3	3	2	2	0	0	2	2	2	3

PREREQUSITES AND MATERIAL

1. Poster color, Black Ink, Scale, Markers and Geometry Box.
2. Brush(0,2, 4 ,8,) Paper (cartridge paper, color , and other types of paper)
3. Acrylic or water and oil-based color require to explore student in bigger surface.

REFERENCE BOOKS

1. Design Basics by David A. Lauer Learning.
2. Design Elements: Understanding the rules and knowing when to break them by Timothy Samara, Rockport Publishers.
3. Design Elements, Form & Space: A Graphic Style Manual for Understanding Structure and Design by Dennis Puhalla, Rockport Publishers.

COLOUR

Foundation @ SOD

L	T	P	C
1	2	2	4

COURSE BRIEF

Colour, or color, is the characteristic of human visual perception described through with names such as red, orange, yellow, green, blue, or purple. The module explores an understanding of three basic elements that are required for an appreciation of color: a light source, an object, and a viewer. It also helps to explore the psychological and cultural factors involved in perception. The importance of color design stems from the significance of color to the human mind and this module shall help in creating ideas, expresses messages, spark interest, and generate certain emotions through compositions.

2023-27

LEARNING OBJECTIVES

One of the most important elements of design, color, is being treated as a separate subject, to learn and explore more in the same. This subject exposes the student to the basic characteristics of color, and the additive and subtractive color theories and its application.

COURSE CONTENTS

- Color terminologies – hue, value, tint, shade, intensity, Chroma, etc.
- Primary colors
- Secondary colors
- Color wheel
- Intermediate colors
- Complimentary colors
- Split complimentary colors
- Grey scale
- Color schemes: monochromatic, warm, cool, complimentary, split complimentary, triadic, analogous,
- Color interaction

COURSE OUTCOMES

Knowledge & Understanding:

After completing this course, you will be able to:

- CO1: Demonstrate an understanding of color theories and color interaction in your work
- CO2: Explain and translate the understanding of color terminology in compositions

Skills and Attributes:

- CO3: Generate practical application and understanding of colors
- CO4: Demonstrate an ability to present creative contextual compositions

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	2	3	0	2	1	0	0	2	0	3	3
CO 2	2	1	3	0	2	1	0	0	3	1	2	3
CO 3	3	1	3	1	1	1	0	0	3	2	2	3
CO4	3	1	3	0	3	1	0	0	3	2	2	3

PREREQUSITES AND MATERIAL

1. Poster color, mostly camel
2. Brush(0,2, 4 ,8,) Paper (cartridge paper, color , and other types of paper)
3. Pastel, and acrylic or water and oil-based color require to explore student in bigger surface.

REFERENCE BOOKS

1. Color influencing form : a color coursebook by Roy Osborne. Publication - Boca Raton, FL: Universal Publishers, 2007
2. Color, form and space by Birren, Faber, Publication- New York. : Reinhold., 1960
3. Colour Interaction with a Three Dimensional Form by Vyas, H. K. 1968
4. Elements of Design: (Advanced) Form & ColourVyas, H. K.
   Design I: The Elements Videotape; Color, Line, Shape & Form, Pattern by Texture Atexinc.
5. The Forms of Color by Gerstner, Karl, Publication -Cambridge : The MIT Press, 1990
6. Colour for Survival by Ward, Peter, Publication - London : Orbis pub, 1980
7. Playing with color: 50 graphic experiments for exploring color design principles by Richard Mehl, Publication - Beverly: Rockport Publishers, 2013
8. Color management : a comprehensive guide for graphic designers (2005 ed.)by John T Drew and Sarah A Meyer, Publication - Switzerland : Roto Vision, 2005
9. Colour: Art & Science edited by Trevor Lamb, Janine Bourriau. Publication - Cambridge University Press.
10. Goethe's Theory of Colours By Johann Wolfgang von Goethe .

11. Colour: A Workshop for Artists and Designers by David Hornung.

REFERENCE URL's

https://www.pantone.com/what-is-color

https://www.quora.com/What-are-designer-colours

https://www.crayola.com/for-educators/resources-landing/articles/color-what-is-color.aspx

GEOMETRY

Foundation @ SODS

L	T	P	C
2	2	2	5

COURSE BRIEF

The course introduces the students to the basic fundamentals of Construction, Visual Perception and Spatial Positioning of Figures/ Objects in 2 Dimensions and 3 Dimensions. The students are empowered with the knowledge and skills to interpret and represent development of 2D and 3D geometry in the form of drafted sheets and study models. The module covers the practical nuances of drafted drawing as an effective communication tool in a cross functional production scheme.

LEARNING OBJECTIVE

Learn axes, planes of projection and types of graphical representations.

Learn standard guidelines of drafting in 2D and 3D representations.

Learn basic geometric shapes and properties, construction of 3d form.

COURSE CONTENTS

UNIT 1 (Fundamentals of Drafting)

Guidelines and Nomenclatures, Lettering, Scales (Engineer's scale, Graphical Scale, Representative Fraction), Two Dimensional Geometrical Constructions (Line and Angle Bisection, Division of lines and circle, Centre point of arc, Calculation of Arc length, Reverse Curves, Evolution and construction of Polygons), Conics and Curvilinear Objects, Representation of 3 Dimensional objects, Principles of Projections, Projections of Points.

UNIT 2 (Principles of Geometry)

Geometry in natural and Man-made environments, Relationship of Pentagon and natural objects, Vitruvian man, Fibonacci series and Golden Ratio, Fractals.

UNIT 3 (Projections of Lines and Solids)

Guidelines and Nomenclatures, Lettering, Scales (Engineer's scale, Graphical Scale, Representative Fraction), Two Dimensional Geometrical Constructions (Line and Angle Bisection, Division of lines and circle, Centre point of arc, Calculation of Arc length, Reverse Curves, Evolution and construction of Polygons), Conics and Curvilinear Objects, Representation of 3 Dimensional objects, Principles of Projections, Orthographic Projections- Isometric and Axonometric projection of regular solids and combination of solids.

UNIT 4 (3D geometry and Development of solids)

Solids (Generation of Volumes, Basic Solids, Additive and Subtractive nature of solids, Development of Surfaces of regular and sectional solids), **Platonic and Archimedean solids** (Identities and differences, Importance and application, Duals of Platonic solids, Truncation of solids)

COURSE OUTCOMES

Knowledge & Understanding:

After completing this course, you will be able to:

- CO1: Demonstrate an understanding of geometric principles in nature
- CO2: Develop an understanding of terminology used to explain projections and fundamentals of drafting

Skills and Attributes:

- CO3: Create platonic solids reflecting an understanding construction of the same
- CO4: Demonstrate and explain the construction of 2D and 3D objects

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	2	2	2	2	2	1	0	0	0	3	2	3
CO 2	2	2	2	2	2	1	0	0	3	1	2	3
CO 3	2	1	2	2	1	1	0	0	3	1	2	3
CO4	3	1	3	1	2	1	0	0	2	1	1	3

PREREQUSITES AND MATERIAL

1. Drawing Board, T square, Set Square, Geometry Box, Brush and Glue
2. Paper (cartridge paper, color , and other types of paper)
3. Acrylic or water and oil-based color require to explore student in bigger surface.

REFERENCE BOOKS

- Engineering Drawing, P.S. Gill, S. K. Kataria & Sons
- Elementary Engineering Drawing (Plane and Solid Geometry), by N.D. Bhatt, Charotar Publishing House
- Geometry of Design: Studies in Proportion and Composition, Kimberly Elam, 2001
- Alt.fractals: A Visual Guide to Fractal Geometry and Design by Eric Baird, 2011
- The Aesthetics of Geometry in Design, Suzanne Greischel, 1983
- Shell foundations: geometry, analysis, design and construction, N. P. Kurian 2006
- Geometry of construction, T.B. Nichols and Norman Keep. Nichols, Trafalgar Bertram. Publication - London : Cleaver-Hume Press, 1947
- Ruler and Compass, Andrew Sutton, 2009

- Geometric constructions with 112 figures, George Edward Martin,1998

SCIENCE & LIBERAL ARTS

Foundation @ SODS

L	T	P	C
1	1	0	2

COURSE BRIEF

The subject aims to introduce design students to Indian Visual culture, history and Society through a Liberal Arts perspective. It aims to sensitize students to the visual aesthetics, cultural practices, viewed against the backdrop of various regional, social, and historical contexts.

LEARNING OBJECTIVE

- To sensitize design students to social, cultural, and historical contexts surrounding design.
- To enable students to discover values, belief systems, and philosophies that underly various cultural, and aesthetic expressions.
- To introduce and expose students to Indian and global art, design, and craft movements.
- To introduce design students to basic methods of inquiry, research, and documentation.
- To enable students to contextualize basic design principles to plural Indian aesthetic identities.
- To enable students to develop visual, written, and oral communication skills.

COURSE CONTENTS

Here's an indicative list of trigger topics based on broad themes. Each theme shall look at how design, function, aesthetics, materials, processes, and techniques have influenced or been influenced by the diversity of place, climate, culture, history, values, and philosophies:

1. **Food**: Philosophy, production, processing, cooking, serving, consumption, waste disposal.
2. **Clothing and accessories**: Everyday, ceremonial, royal, gender, age, body, comfort, identity.
3. **Shelter**: Settlement patterns, form, comfort, services, tribal, vernacular, classical architecture.
4. **Communication**: Language, signs and symbols, text, script, music, dance, theater.
5. **Transport**: Means and methods, every day, royal, ceremonial, accessories, individual, group, mass.

COURSE OUTCOMES

Knowledge & Understanding:

After completing this course, you will be able to:

CO 1: Research and document cultural/ethnic backgrounds, and to discover underlying beliefs, philosophies, and value systems.

CO 2: Contextualize cultural heritage with the historical backdrop of Indian and global art, design, and craft.

Skills and Attributes:

CO 3: Corelate basic design principles such as elements, colour, geometry, materials and techniques with historical and contemporary design, and craft.

CO 4: Organize, articulate, and present information, and ideas through visual, textual, and oral presentations.

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	2	3	1	3	1	1	0	1	2	1	2	3
CO 2	3	2	2	2	2	1	0	1	3	1	2	3
CO 3	3	1	3	2	2	3	0	1	2	1	2	3
CO4	3	2	3	3	2	2	0	1	3	2	2	3

PREREQUSITES AND MATERIAL

1. Basic drawing skill ,
2. Pencil (2B , 4 B, 6B) Paper (cartridge paper, color , and other types of paper)
3. Color- poster, acrylic, and other
4. Laptop and Camera

REFERENCE BOOKS

Liberal Arts and Sciences: Thinking Critically, Creatively, and Ethically by Christopher A. Ulloa Chaves ED.D.

MATERIAL EXPLORATION-I

Foundation @ SOD

L	T	P	C
1	0	2	2

COURSE BRIEF

The module introduces students to material and technical exploration. In this semester, the students will explore planar and granular material and understand the possibilities of form exploration with the same while understanding the properties and characteristics of the same. The module is designed to allow each student to pursue a personal direction in their work that may be traditional or non-traditional. With focus on ideation and exploration, the module aims at exposing the basic properties, simple techniques and methods to add/remove material, and how to evolve new forms using the properties. Through a series of lectures, discussions, exercises, and assignments, students will acquire the fundamental knowledge and skills required for entry into the professional world.

LEARNING OBJECTIVE

Student will learn about the property and characteristics of materials and gain knowledge and skills to work on it by using basic tools and techniques.

COURSE CONTENT

This is entirely a manual process-based module, and only hand tools will be used for carrying out all the exercises. The students will be exposed to:

Planar Material (paper, fabric, etc.)

Granular Material (clay, pop, etc.)

TOOLS

Use of basic hand tools -

- Cutter
- Scissors
- Saw

- Chisel
- File
- Tri angle
- Hammer
- Holders etc.

TECHNIQUES

- Demo of properties of Materials
- Sample manipulations
- Explanation of each property
- Various methods of addition and removal
- Assignments based on explorations of properties

COURSE OUTCOMES

After completing this course, you will be able to:

Knowledge & Understanding:

- Explain properties of material through manipulation technique. (CO1)

Skills and Attributes:

- Apply knowledge and understanding of material behavior and techniques to create design expression (CO2)
- Demonstrate skillset of working with material and related tools via exploration and manipulation (CO3)

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	0	3	2	2	1	0	0	1	3	2	3
CO 2	3	2	3	3	3	2	0	0	3	2	2	3
CO 3	3	2	3	3	3	2	0	0	2	2	2	3

PREREQUSITES AND MATERIAL

1. Basic drawing skill
2. Material as specified by the faculty
3. Pencil (2B, 4 B, 6B) Paper (cartridge paper, color , and other types of paper)
4. Mask and Apron

REFERENCE BOOKS

1. The Backyard Blacksmith Hardcover - by **Lorelei Sims** , publisher : Crestline book
2. Learners World Clay Moulding Book Clay Tools, AC 073 ASIN B00HJ2VNNA
3. Clay Modeling Books, by **Gurinder**, young learner publications
4. BETWEEN CLAY AND DUST-by : **MUSHARRAF ALI FAROOQI**, publisher : Aleph book company pvt. Ltd.
5. The Potter's Complete Book of Clay and Glazes: A Comprehensive Guide to Formulating, Mixing, Applying, and Firing Clay Bodies and Glazes. by **James Chappell**.
6. The Incredible Clay Book. Publishr : Klutz Press by Sherri Haab (Editor), Laura Torres
7. On the Effects of Gypsum, or Plaster of Paris, as a Manure; Chiefly Extracted from Papers and Letters on Agriculture, by the Agricultural Society in Canada, by **Multiple Contributors**
8. Plaster of Paris and How to Use It, by **Martin Wiener Ware**
9. Plaster of Paris: Techniques from Scratch, by **Reid Harvey**

10. Create Anything With Clay, by Sherri Haab , Laura Torres publisher : Kultz press
11. Plaster of Paris: Techniques from Scratch Paperback – by **Reid Harvey publisher**: Gentle breeze publication

Year 1

Semester 2

2023-27

SKETCHING AND DRAWING-II

Foundation @ SOD

L	T	P	C
4	0	2	5

COURSE BRIEF

Increasing the level of complexity from previous semester the sketching and drawing- 2, this semester will focus more on learning to gain control over hand movement to achieve the desired result with different mediums on different surfaces. The students shall also work with creativity and imagination to explore and create detailed drawings with play of light and shadow for a context.

LEARNING OBJECTIVES

- Enhances on student's previous learnings of Visual Perception and Spatial Positioning of Figures/ Objects in two dimensions and three dimensions.
- Empower students with the knowledge and skills to observe, explore, experiment and represent their observation while playing with different mediums.
- Display rigor and experimentation while looking at details of light and shadows along with expressions and techniques.

COURSE CONTENTS

This subject is an extension of learning gained in semester I. Having gained the basic skills, the student is now prompted to move ahead, with complex cases, and make complete drawing with details.

- **Nature Drawing:**
  Importance of light and shade and drawing. Impact of changing the surface and medium. Looking at details and bringing aesthetically pleasing compositions
- **Human Drawing:**
  Understand the proportions of body. Looking at human form with details and precision. Looking at human form in relation to another subject/ object.
- **Object Drawing:**
  Form in perspective and in context. Creating images that communicate and ways and means to say it.

COURSE OUTCOMES

Knowledge & Understanding:

After completing this course, you will be able to:

- CO1: Reflect an understanding of form and proportions

Skills and Attributes:

- CO2: Experiment and explore drawing techniques to create aesthetically pleasing compositions.
- CO3: Illustrate ideas with details and sensitivity.
- CO4: Communicate ideas effectively through visual representations

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	2	0	3	3	3	3	0	0	1	0	1	3
CO 2	3	2	3	3	3	2	0	0	3	0	1	3
CO 3	3	0	3	3	3	2	0	0	2	2	2	3
CO4	3	1	3	3	3	1	0	0	3	2	1	3

PREREQUSITES AND MATERIAL

- Basic drawing skill
- Pencil (2B, 4B, 6B) Paper (cartridge paper, color , and other types of paper)
- Require few objects and human models for Live sketching

REFERENCE BOOKS

1. Sketching: Drawing Techniques for Product Designers by Koos Eissen(Author), Roselien Steur(Author), BIS Publishers
2. Drawing for Product Designers (Portfolio Skills: Product Design) by Kevin Henry, Laurence King Publishing
3. Perspective and Sketching for Designers by Jessica Newman

4. Jessica Newman and Jack Beduhn, Prentice Hall
5. Freehand Drawing For Architects and Interior Designers by Magali Delgado Yanes
6. Magali Delgado Yanes (Author), Ernest Redondo Dominguez and Maria Fleming Alvarez,
7. Design Drawing by Francis D. K. Ching and Steven P. Juroszek, Wiley
8. How to Draw: drawing and sketching objects and environments from your imagination by Scott Robertson and Thomas Bertling, Design Studio Press
9. Sketching: The Basics by Roselien Steur an Koos Eissen, BIS Publishers
10. Anatomy and Drawing by Victor Perard, Dover Publications
11. Illustration With Markers/Time-Saving Techniques for Design Professionals by John A. Gleason, Whitney Library of Design
12. Rendering with Pen and Ink by Robert W. Gill, W Norton & Co Inc

URL

- https://www.creativebloq.com/features/how-to-draw-animals-people-landscapes
- https://design.tutsplus.com/tutorials/how-to-draw-a-rose--cms-26864
- https://www.thegreatcourses.com/courses/how-to-draw.html
- http://www.floobynooby.com/pdfs/Perspective_Drawing_HandbookJosephDAmelio.pdf
- https://www.pdfdrive.com/human-figure-drawing-books.html

PRINCIPLES OF DESIGN

Foundation @ SOD

L	T	P	C
1	1	2	3

COURSE BRIEF

In this course, which is an extension of design basics learnt in the earlier semester, thrust is given on understanding and learning of principles for visualization. Human eyes follow certain unwritten yet universally true principles. Once understood, these principles are to be thoroughly explored, to create visuals and aesthetically pleasing compositions demonstrating the application of principles.

LEARNING OBJECTIVE

The module introduces the students to

- Create communicative compositions, applying knowledge and understanding of elements and principles of design.
- Gestalt laws and its application.
- Creative thought process, self-exploration, and deriving a final on comparative basis.

COURSE CONTENT

Gestalt Law

Introduction to Gestalt psychology. Gestalt's principles of visualization, these principles in nature, application in creative work of prominent artists/designers

Harmony and Rhythm

Few of the basic principles, underlying the pleasantness of a visual. What is visual harmony and what is visual disharmony? what is the impact of rhythm on a visual? These questions will be answered by a detailed and elaborate demonstration to the students, followed by exploratory assignments to be done by the students.

Emphasis

"Center of Interest." It is about dominance and influence. Most artists put it a bit off center and balance it with some minor themes to maintain our interest. Some artists avoid emphasis on purpose. They want all parts of the work to be equally interesting.

Contrast

Uses contrasting visual concepts. That same Western Kansas "big sky" landscape becomes very dramatic and expressive when a storm builds in the southwest. Principles can grow out of any artistic device that is used to produce an effect on the viewer.

Balance

This is perhaps the most subjective principles of design. A visual looks good if it is well balanced, and if it is not, the eyes tend to reject it as unpleasant. However, it is not the physical balance but the visual balance – the interaction between the positive and negative spaces in a given format. Learning this principle involves going through and analyzing substantial examples.
What is symmetry? What are the different types of symmetry? The discussion would involve examples of symmetry in nature and man-made environment. The exercises will also involve relation between symmetry, asymmetry and balance.

COURSE OUTCOME

Knowledge & Understanding:

After completing this course, you will be able to:

- CO1: Understand fundamentals of principles of design.

Skills and Attributes:

- CO2: Employ visual, material, hand-skills and digital techniques to generate original forms.
- CO3: Implement fundamentals by developing conceptual ability and the necessary skills of creating communicative compositions
- CO4: Observe and explore visual language as a tool of communication

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	0	3	2	2	2	0	0	0	2	2	3
CO 2	3	0	3	2	3	2	0	0	0	2	2	3
CO 3	3	0	3	2	2	2	0	0	1	1	2	3
CO4	3	2	3	3	3	2	0	0	3	2	2	3

PREREQUSITES AND MATERIAL

- Poster color, Black Ink, Black pen, Scale, Markers and Geometry Box.
- Brush(0,2, 4 ,8,) Paper (cartridge paper, color , and other types of paper)
- Laptop or personal computer

REFERENCE BOOKS

1. Design Basics by David A. Lauer Learning.
2. Logic and Design: In Art, Science and Mathematics by Krome Barratt, Green Editorial.
3. Illustrated Elements of Art and Principles of Design by consultant: Gerald F. Brommer, Crystal Productions.
4. Design Elements: Understanding the rules and knowing when to break them by Timothy Samara, Rockport Publishers.
5. Design Elements, Form & Space: A Graphic Style Manual for Understanding Structure and Design by Dennis Puhalla, Rockport Publishers.
6. Universal Principles of Design by William Lidwell, Kritina Holden and Jill Butler, Rockport Publishers.

DESIGN PROCESS

Foundation @ SOD

L	T	P	C
3	2	2	6

COURSE BRIEF

Design is a process. Anyone who wants to get into the field of design, irrespective of the discipline or specialization, needs to get conversant with the basic steps, their relevance, methods and approaches involved in the process of designing. Besides looking at creating visual and design vocabulary, this course will also introduce the methods and give students an overview of the process of design which is essential to understand and appreciate the design development through observation, study, exploration, ideation and perception.

LEARNING OBJECTIVE

- To introduce students to the different stages in the design process – from perception of a problem to generating a solution to the problem through investigation, analysis and synthesis.
- To understand the methodology of the problem solving process.

COURSE CONTENTS

- Analysis and mapping of the design process.
- The morphology of the problem solving process
- Case studies
- Role of creativity in design

COURSE OUTCOMES

Knowledge & Understanding:

After completing this course, you will be able to:

- CO1: Understand the steps invoved in design process.
- CO2: Interpret and analyze visual and textual information to develop perception and ideas for expression.

Skills and Attributes:

- CO3: Design a thoughtful tangible outcome using skill, knowledge and understanding explored in other modules.
- CO4: Document the entire learning process, exploration, progression of design understanding and sequence of design development.
- CO5: Demonstrate engagement with content via reading, researching and participating in classroom discussions and activities.

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	3	3	3	3	1	1	1	1	1	3	3
CO 2	3	3	3	3	3	2	1	2	2	2	2	3
CO 3	3	2	3	2	2	2	1	2	1	2	2	3
CO4	3	3	3	3	3	2	1	2	3	2	2	3
CO5	1	3	2	2	1	2	1	3	2	1	2	3

PREREQUSITES AND MATERIAL

1. Basic drawing skill ,
2. Pencil (2B , 4 B, 6B) Paper (cartridge paper, color , and other types of paper)
3. Color poster acrylic, and other
4. Laptop and Camera

REFERENCE BOOKS

1. Thinking Design by S Balaram
2. The Design Process by Karl Aspelund

3. Thoughts on Design by Paul Rand
4. The Design of Everyday Things by Don Norman
5. Change by Design by Tim Brown
6. Designing for Growth by Jeanne Liedtke

MATERIAL EXPLORATION-II

Foundation @ SOD

L	T	P	C
1	0	2	2

COURSE BRIEF

Material Exploration for this semester will focus on the creating design expression through manipulating and modifying porous and fibrous material like wood to strong, hard and shiny material like metal. With emphasis placed on ideation, and exploration this subject will promote curiosity and an atmosphere conducive to material and technical exploration. Material Exploration aims at exposing the basic properties, simple techniques and methods to add/remove material, and how to evolve new forms using the properties. Through a series of lectures, discussions, exercises, and assignments, students will acquire the fundamental knowledge and skills required for understanding and playing with material.

LEARNING OBJECTIVE

Student will learn about the property and characteristics of materials and also gain knowledge and skills to work on it by using basic tools and techniques.

COURSE CONTENT

This is entirely a manual process-based module, and only hand tools will be used for carrying out all the exercises. The students will be exposed to:

- WOOD (deodar, golden teak, sesame, Sal, rosewood) etc.
- METAL (aluminum, steel,) etc.

TOOLS

Use of basic hand tools -

- saw

- chisel
- file
- drill
- tri angle
- hammer
- planer
- holders
- jointer
- Sander machine etc.

TECHNIQUES

- Demo of properties of Materials
- Sample manipulations
- Explanation of each property
- Various methods of addition and removal
- Assignments based on explorations of properties

COURSE OUTCOMES

After completing this course, you will be able to:

Knowledge & Understanding:

- CO1: Demonstrate an understanding of material properties through manipulation technique.

Skills and Attributes:

- CO2: Demonstrate skillset of working with material and related tools via exploration and manipulation
- CO3: Apply knowledge and understanding of material behavior and techniques to create design expression.

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	0	3	2	2	1	0	0	0	3	2	3
CO 2	3	0	3	3	3	1	0	0	0	2	2	3
CO 3	3	2	3	3	3	2	0	0	2	2	2	3

PREREQUSITES AND MATERIAL

- Basic drawing skill
- Material as specified by the faculty
- Pencil (2B, 4B, 6B) Paper (cartridge paper, color , and other types of paper)
- Mask and Apron

REFERENCE BOOKS

1. What Wood Is That? A Manual of Wood Identification by Herbert L. Edlin (Author) publisher : Viking adult
2. Understanding Wood: A Craftsman's Guide to Wood Technology by R. Bruce Hoadley publisher: Taunton press
3. Wood: Materials for Inspirational Design, by Chris Lefteri
4. Solid Wood: Case Studies in Mass Timber Architecture, Technology and Design 1st Edition , by Joseph Mayo
5. Wood: Identification and Use, by Terry Potter, Publisher : guild of master craftsmen Nature & Art of Workmanship, by David Pye
6. Creative Metal Forming – by Betty Helen Longhi (Author), Cynthia Eid (Author), publisher :Brynmorgen press
7. The Backyard Blacksmith Hardcover – by Lorelei Sims , publisher : Crestline book

COMPUTER APPLICATIONS

Foundation @ SOD

L	T	P	C
1	0	2	2

COURSE BRIEF

This subject gives an exposure to basic design software used in design disciplines. The tools are used extensively in varied industries as well. It is very important to understand how to design graphics as well as how to handle the tools effectively. Through a series of lectures, discussions, exercises, and assignments, students will acquire the fundamental knowledge and skills required for entry into the professional world.

LEARNING OBJECTIVE

Develop necessary digital tools and techniques.

Enhance the techniques of execution of form and content relevant to the field in both digital and print mediums.

Create and manipulate images to use in various contexts.

The learnings will also help in understanding of form - product, spaces, and layouts for print and web.

COURSE CONTENT

Adobe Photoshop

Basic exposures and learning to experiment with various possibilities. Application oriented exercises with actual photographs/images.

- Images in Photoshop and Image Ready (Default images)

- Intro to Tools Selections & Color Models
- Working with Layers
- Transforming & Retouching
- Color & Tonal Adjustments
- Working with Typography

Adobe Illustrator

Basic exposures and learning to experiment with various possibilities. Application oriented exercises to create graphics and sketches for a purpose.

- Graphics creation
- Intro to Tools Selections & Color Models
- Working with Layers
- Transforming & Manipulating
- Grids and layouts
- Working with Typography

COURSE OUTCOME

After completing this course, you will be able to:

Knowledge & Understanding:

- CO1: Demonstrate an understanding of tools and techniques used to create effective compositions.

Skills and Attributes:

- CO2: Create graphics and images using tools and techniques of divergent thinking
- CO3: Apply basic design concepts – light, color, texture etc. to create aesthetically pleasing graphics/images

Co-relation Course Outcomes (COs) and Program Outcomes (POs)

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	Develop a creative mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Inter-Disciplinary Approach	Entrepreneurial Spirit	Teamwork	Professional Ethics	Sustainable Solution	Local and Global Context	Lifelong Learning
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	0	3	2	2	0	0	0	1	1	2	3
CO 2	3	0	3	3	3	1	0	0	1	1	2	3
CO 3	3	0	3	3	3	1	0	0	1	1	2	3

PREREQUSITES AND MATERIAL

- Basic drawing skill
- Laptop, or personal computer

REFERENCE BOOKS

1. The Adobe Photoshop CS6 Book for Digital Photographers (English) by Scott Kelby

2. Adobe Photoshop CS6 for Photographers: A professional image editor's guide to the relative use of Photoshop for the Macintosh and PC by Martin Evening.
3. Adobe Illustrator for beginners 2021, Hector Grant

Year 2

Semester 3

Course: User Centered Design Process C: L: T: P :: 2:0:1:2

1. Course Brief:

Designers often overlook users' needs while designing products – be it physical or digital. User-centered design approach puts users at the center of design process from beginning to finish to ensure effective design of products. This course lays a foundation towards understanding how designers can effectively utilize different tools to understand and analyze user needs and situations. How to formulate effective research questions surrounding user needs and evaluate the usefulness of designed solution. The course also intends to familiarize students with various research methods and research through design approach to help them gain a broader understanding about the scope and principles of UCD.

2. Learning Objective:

- Understand what Design is and Design thinking.
- Develop an eye for identifying crucial user needs through a human-centered design process.

3. Course Contents:

A. Theoretical

- Introduction
    - What is Design and Design Thinking?
- Understanding Users and Design Process
    - Conveying user needs: Sketching and Storyboarding, Scenario generations, personas, situations and requirements.
    - UCD Process
    - Design Research – understanding how mixed methods can be used to identify crucial needs of context under study.
- Design Methodologies – contextual inquiry, interviews, questionnaires, task analysis, affinity analysis, use cases
- Analyzing user data and identifying needs
- User centered design case studies
    - IDEO, Google

B. Practical

Students will involve in small assignments and hands-on activities. These include:

- User studies conducted in various contexts – field studies that include observations
- Conceptualization, mock-up of Design intervention identified from field studies

4. Course Outcomes

CO1: Students will understand and familiarize with the concept of UCD, Design thinking.

CO2: Gain practical understanding about various aspects of user research and be able to utilize various tools to understand and analyze user and their needs properly.

CO3: Create human-centered solutions by utilizing design thinking to address various needs of users/society.

5. Prerequisites and Materials

a) Sticky notes, chart papers, color pens, threads, pin boards, white boards, etc., (Anything to capture user responses and analyze them – mostly on paper).
b) An understanding about Design, Design Process and Design Methods.

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	2	3	1	3	1	1	1	1	3	1	1	2	2	2
CO2	1	3	2	3	1	3	1	3	2	1	3	1	1	2	2	2
CO3	3	3	3	3	1	3	1	1	1	1	2	1	2	2	2	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Reference Books:-

1. Brown, T. (2009). Change by design.
2. Preece, J., Rogers, Y., & Sharp, H. (2015). Interaction design: beyond human-computer interaction. John Wiley & Sons.
3. Norman, D. (2013). The design of everyday things: Revised and expanded edition. Basic Books (AZ).
4. Still, B., & Crane, K. (2017). Fundamentals of user-centered design: A practical approach. CRC Press.
5. Keinonen, T. (2017). *Designers, users and justice*. Bloomsbury Publishing.

Course: Fundamentals of Interaction Design — C: L: T: P :: 3:0:1:4

1. Course Brief:

This subject focuses on the conceptualization, design, implementation and evaluation of interactive computing systems for human use in various real-world contexts. Students will gain basic understanding about human-computer interaction (HCI) and interaction design principles, human-centered design (HCD) process, tools and

techniques necessary for developing interactive computing products and their usability evaluation.

2. Learning Objective:

- To read and familiarize with the what HCI, Interaction Design and Design Thinking is
- To understand the scope of applications of principles of Interaction Design through HCD process

3. Course Contents:

C. Theoretical

- What if Interaction Design and HCI?
    - Differences between Interaction Design and HCI
    - Historical Roots
    - Likely future developments
- Concepts of Interaction Design and HCI, Design Thinking
    - Guidelines in HCI
        - Norman's seven principles
        - Nielsen's ten heuristics with example of its use
    - Laws and Principles of Interaction Design
        - Fitt's law, Hick-Hyman's law, Poka-Yoke principle
        - Navigation Design
- Basic usability evaluation methods
    - Heuristic evaluation, Simple usability testing
- Interaction Design Case-studies
    - Collaborative work environment in an educational scenario using multiple mouse inputs
    - Using ethnographic data to understand ATM usage of Indian Users

D. Practical

Students will involve in small assignments in form of hands-on activities and sessions. These include:

1. Designing an interactive system using interaction and navigation design principles.
   (subjected to change by course faculty)

4. Course Outcomes

CO1: Students will understand about principles of Interaction Design and User Experience Design

CO2: Creating new interface following interaction and navigation design principles

CO3: Gain understanding about the evaluation of interactive computing systems.

5. Prerequisites and Materials

c) A creative mindset that connects dots and knowledge from different fields. An inter- disciplinary approach towards Design would be a big plus.
d) Some programming skills would be good.
e) Keeping up with new trends and emerging technologies will help you go a long way – creatively and technically.

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	2	3	2	3	1	1	1	1	3	1	1	2	2	2
CO2	1	1	2	3	2	3	1	1	1	1	3	2	1	3	3	3
CO3	3	3	3	3	1	3	1	1	1	1	2	1	3	2	2	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Reference Books:-

1. Preece, J., Rogers, Y., & Sharp, H. (2015). Interaction design: beyond human-computer interaction. John Wiley & Sons.
2. Norman, D. (2013). The design of everyday things: Revised and expanded edition. Constellation.

3. Shneiderman, B. (2010). *Designing the user interface: strategies for effective human-computer interaction*. Pearson Education India.

Case Study:

1. De Angeli, A., Athavankar, U., Joshi, A., Coventry, L. and Johnson, G.I. (2004) Introducing ATMs in India: a contextual inquiry. Interacting with Computers 16(1), 29–44.
2. Reddy, V. P., Singh, K., & Yammiyavar, P. (2009). User Centered Design of a Computer Supported Collaborative Work Environment in an Educational Scenario using Multiple Mouse Inputs: A Case Study. In ICORD 09: Proceedings of the 2nd International Conference on Research into Design, Bangalore, India 07.-09.01. 2009.

URL:-

1. https://www.iitg.ac.in/cseweb/vlab/creative-design-prototyping/index.html
2. https://nptel.ac.in/syllabus/syllabus.php?subjectId=106103115
3. https://www.nngroup.com/articles/ten-usability-heuristics/

Course: Cognitive Ergonomics-I: Fundamentals and Practices C: L: T: P :: 2:1:0:2

1. Course Brief:

Cognitive ergonomics (also known as cognitive human factors) is a fundamental subject of study under interaction design programme as study of user behavior is very important to design user interface and to decide upon interaction styles. Interaction styles have direct impact on user emotions and satisfaction and thus user experience.

2. Learning Objective:

- To learn theories and principles of cognitive ergonomics
- To understand the scope of applications of principles of cognitive ergonomics in design

3. Course Contents:

E. Theoretical

- Definition of Ergonomics and Human Factors Engineering
- Definition of Cognitive Ergonomics
- Elementary ideas on Sensation, Perception, Cognition, and Attention
- Memory and its relevance in Interaction Design: Short Term Sensory Memory (STSM), Short Term Memory (STM), Long Term Memory (LTM)
- Human Information Processing
- Human Emotion and Affect
- Human Factors Guidelines for UI design

F. Practical

A student has to perform small assignments to understand basics of cognitive ergonomics. Tentative assignments are as follows-

- Stroop Test for selective attention capacity and skills
- Ishihara test for Colour Blindness
- Find out and Represent 5 examples of Affordance and 5 examples of Classical Conditioning

- SAM test for emotion monitoring
- Design the Screen Saver/ Home Page of an app applying HF guidelines

4. Course Outcomes

CO1: Students will gain knowledge about definitions and fundamentals of cognitive human factors

CO2: Students will understand the principles of cognitive ergonomics through evaluation of various designs

Table: Correlation of POs an PSOs v/s COs

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	2	2	3	1	1	1	1	3	1	1	2	3	2	2	2
CO2	2	2	2	3	1	1	1	1	3	1	1	3	3	2	3	2

5. Prerequisites and Materials

- Students should have basic understanding of human behaviour and analysis.
- Basic soft skill on illustration and presentation skill might be required for this course.

Reference Books:-

3. Benyon, D., Turner, P., & Turner, S. (2005). *Designing interactive systems: People, activities, contexts, technologies*. Pearson Education.
4. Gaines, B. R., & Monk, A. F. (2015). *Cognitive Ergonomics: Understanding, Learning, and Designing Human-Computer Interaction*. Academic Press.
5. Hollnagel, E. (Ed.). (2003). *Handbook of cognitive task design*. CRC Press.
6. Jordan, P. W. (2003). *Designing pleasurable products: An introduction to the new human factors*. CRC press.
7. Long, J., & Whitefield, A. (Eds.). (1989). *Cognitive ergonomics and human-computer interaction* (Vol. 1). Cambridge University Press.
8. Norman, D. A. (2004). Emotional design. *Ubiquity*, *2004*(January), 1.
9. Salvendy, G. (2012). *Handbook of human factors and ergonomics*. John Wiley & Sons.

URL:-

1. http://www.dsource.in/course/introduction-cognitive-ergonomics-design/introduction
2. http://alexlogan.com/nasa/color_science.html

Course: Principles of Information Design C: L: T: P :: 3:1:2:0

1. Course Brief:

Information Design is a basis of information presentation and user interface design. Designers are generally classify information as per the requirement of users while performing a task. In addition, knowledge on principles of Information Design is essential for wireframe design for a user interface. The different ways of information presentation is also related to Information Design.

2. Learning Objective:

- To know principles of Information Design
- To understand the ways of information classification
- To understand the ways of information presentation

3. Course Contents:

G. Theoretical

- Definition of Information Design
- Types of Information
- Ways of Information Presentation including Infographics
- Information Classification and Information Architecture (IA)

- Ways of Information Classification (LATCH method)
- Information Classification Techniques: Hierarchical, Task Flow Based, Card Shorting (Open and Close) etc.

H. Practical

1. A student has to prepare IA for a Web Application Design using one or more these following topics –

- Hierarchical
- Task Flow Based
- Card Shorting Based

2. Categorization of information using LATCH framework

4. Course Outcomes

CO1: Students will gain knowledge about definitions and fundamentals of Information Design

CO2: Students will understand the principles of Information Design

CO3: Students will apply various techniques and methods of information classification and presentation to design IA

Table: Correlation of POs an PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	2	3	2	3	1	1	1	1	3	1	1	3	3	3
CO2	1	1	2	3	2	3	1	1	1	1	3	2	1	3	3	3
CO3	3	3	3	3	1	3	1	1	1	1	2	1	3	3	2	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of human thought process.
- Basic soft skill on illustration and presentation skill might be required for this course.

Reference Books:-

1. Cairo, A. (2012). *The Functional Art: An introduction to information graphics and visualization*. New Riders.
2. Dade-Robertson, M. (2011). *The Architecture of Information: architecture, interaction design and the patterning of digital information*. Routledge.
3. Gobert, I., & Van Looveren, J. (2014). *Thoughts on designing information*. Lars Müller Publishers| Luca School of Arts; Zurich, Zwitserland.
4. Heller, S., & Holmes, N. (2006). *Nigel Holmes: on information design*. Jorge Pinto Books Inc..
5. McCandless, D. (2012). *Information is beautiful* (pp. 978-0007294664). London: Collins.
6. Rendgen, S., Wiedemann, J., Ciuccarelli, P., Wurman, R. S., Rogers, S., & Holmes, N. (2012). *Information graphics*. Cologne, Germany: Taschen.

URL:-

1. https://www.usability.gov/what-and-why/information-architecture.html
2. https://www.uxbooth.com/articles/complete-beginners-guide-to-information-architecture/
3. https://uxdesign.cc/information-architecture-the-latch-framework-7f2831ef9e9e

Course: Open Elective 1: Principles of Creativity and Innovation C: L: T: P :: 3:1: :2

1. Course Brief:

Creativity is the ability to bring novel ideas to provide solutions for the problems faced by different stakeholders in a society. Creative solutions are also very helpful for business ecosystems. Thus, creativity and innovations are strongly related to each other.

2. Learning Objective:

- To learn principles of creativity and innovation
- To apply these rules of creativity for creative solutions for business and society.

3. Course Contents:

I. Theoretical

- Definitions of Creativity, Innovation and Invention
- Creative Engines and its Components: Culture, Habitat, Resources, Knowledge, Imagination and Attitude.
- Decomposition followed by Convergence
- Relate unrelated objects/ thoughts
- Rethinking is the Design Thinking
- Brain Storming, Mind Mapping and Idea Menu

J. Practical/Tutorial

A student has to pursue following assignments –

1. Product or interface design ideas using the rule "Relate unrelated objects/ thoughts" for a selected problems of daily life of a student
2. Product or interface design ideas using the rule "Decomposition followed by Convergence" f or a selected problems of daily life of a student

4. Course Outcomes

CO1: Students should have clear understanding principles of creativity and innovation

CO2: Students should able to apply principles of creativity to bring novel ideas.

CO3: Students will provide novel creative solutions in a use context

Table: Correlation of POs an PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	1	3	1	1	1	1	1	1	1	1	1	1
CO2	3	1	3	3	1	3	1	1	1	2	1	2	1	1	1	2
CO3	3	3	3	3	1	3	1	1	1	2	1	1	1	1	1	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic modelling skill.
- Basic soft skill on illustration and presentation skill might be required for this course.

Reference Books:-

1. Caan, S. (2011). *Rethinking design and interiors: Human beings in the built environment*. London: Laurence King,.

2. Creveling, C. M., Slutsky, J., & Antis, D. (2002). *Design for Six Sigma in technology and product development*. Prentice Hall Professional.
3. Dodge, M., Kitchin, R., & Perkins, C. (Eds.). (2011). *Rethinking maps: new frontiers in cartographic theory*. Routledge.
4. Kimbell, L. (2011). Rethinking design thinking: Part I. *Design and Culture*, *3*(3), 285-306.
5. Seelig, T. (2012). *inGenius: A crash course on creativity*. Hay House, Inc.
6. Seelig, T. (2017). Creativity Rules: Get Ideas Out of Your Head and into the World.
7. Yang, K., Basem, S., & El-Haik, B. (2003). *Design for six sigma* (pp. 184-186). New York: McGraw-Hill.

URL:-

1. https://doi.org/10.1016/S0142-694X(99)00030-7
2. https://link.springer.com/content/pdf/10.3758%2FBF03196731.pdf

Course: Design Project 1: Simple Interaction Design C: L: T: P :: 6:0:0:12

1. Course Brief:

Interaction Design Project is important, as students need to have practical and field study related experience. Students generally have opportunity to apply their theoretical learnings directly into real life scenarios. In this very first design project of the interaction design programme, students will have opportunity to apply Simple Interaction design Process to pursue their project focusing mainly on static/dynamic website design.

2. Learning Objective:

- To know and understand simple interaction design lifecycle model
- To gain project handling experience
- To know static/dynamic website design and technology

3. Course Contents:

K. Practical

A student has to design static/dynamic website applying knowledge gained through all other courses in semester 3. Following steps of simple interaction design lifecycle may be useful to pursue the design project –

- Identify needs/ establish requirements
- Design
- Build an Interactive Version (Low Fidelity Prototype may be encouraged at this level)
- Evaluate
- Redesign (if required)

4. Course Outcomes

CO1: Student should able to understand the scope for UI and UX design intervention for web-based solutions

CO2: Student should able to apply gained knowledge from other courses of semester 3 in their design project

CO3: Student should able to examine the scope of new design under design project

CO4: Student should able to justify the reason for selection of a design problem or solution

CO5: Student should able to formulate unique/novel/new and effective solution against certain design problem.

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	1	3	1	1	1	1	1	1	1	2	2	2
CO2	3	1	3	3	1	3	1	1	1	2	1	2	1	1	1	2
CO3	2	3	3	3	1	3	1	1	1	2	1	1	1	1	1	2
CO4	1	2	2	3	1	1	2	1	1	2	1	1	1	1	1	1
CO5	2	2	2	2	1	2	1	1	1	1	2	1	2	3	3	3

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have knowledge gained in the different courses under the current semester.
- Basic soft skills on illustration, presentation and prototyping might be required for this course.

Reference Books:-

1. Benyon, D., Turner, P., & Turner, S. (2005). Designing interactive systems: People, activities, contexts, technologies. Pearson Education.
2. Cooper, A., Reimann, R., & Cronin, D. (2007). *About face 3: the essentials of interaction design*. John Wiley & Sons.
3. Preece, J., Rogers, Y., & Sharp, H. (2015). Interaction design: beyond human-computer interaction. John Wiley & Sons.

URL:-

3. https://www.rookieup.com/blog/5-ux-ui-design-portfolio-projects-beginners/

4. https://www.uxbeginner.com/5-hidden-sources-of-ux-portfolio-projects/

Year 2

Semester 4

Course: Visual Interface Design: Aesthetics Principles in UI Design C: L: T: P :: 3:1:2:0

1. Course Brief:

Visual interfaces are generally helping to interact with the system or a software based on visual clues such as icons, buttons, and hyperlinked text etc. For instance, the Graphical User Interface (GUI) is present in case of the both mobile and desktop/laptop operating systems and apps. User-system interaction might be depending on the aesthetics (look and feel) of the visual interface.

2. Learning Objective:

- To learn elements of visual design and aesthetics design principles
- To apply the elements of design and design principles to design logo/icons, layout and compositions

3. Course Contents:

A. Theoretical

- Definitions of Visual Aesthetics and Visual Interface
- Elements of Visual Interfaces
- Application of Elements of Visual Design: Case Studies
- Application of Principles of Visual Design: Case Studies
- Typeface and its application in Visual Interface Design
- Elementary ideas on Layout and Alignments
- Elementary ideas on Background Colour and Font Colour
- Branding aspects of Visual Interface Design

B. Practical/Tutorial

A student has to perform small assignments to applications of Elements of Visual Design and Principles of Visual Design. Tentative assignments are as follows-

- Icon/Logo Design
- Semantic Typography
- Designing Website Layout OR Mobile app layouts

4. Course Outcomes

CO1: Students will gain knowledge about visual elements and principles of interface design

CO2: Students will understand scope of applications of the visual design principles in visual interface design

Table: Correlation of POs and PSOs v/s COs

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	1	1	1	1	3	1	1	3	3	2	3	3

(High)

5. Prerequisites and Materials

- Students should have basic understanding of elements and principles of design.
- Soft skill on Adobe Illustrator, Adobe Photoshop and Adobe XD will be required for this course.
- Students should install above-mentioned software in their PC/Laptop.

Reference Books:-

1. Carter, R., Meggs, P. B., & Day, B. (2011). *Typographic design: Form and communication*. John Wiley & Sons.
2. Craig, J., & Scala, I. K. (2012). *Designing with type: the essential guide to typography*. Watson-Guptill.
3. Lankow, J., Ritchie, J., & Crooks, R. (2012). *Infographics: The power of visual storytelling*. John Wiley & Sons.

4. Wheeler, A. (2017). *Designing brand identity: an essential guide for the whole branding team*. John Wiley & Sons.
5. Yau, N. (2011). *Visualize this: the Flowing Data guide to design, visualization, and statistics*. John Wiley & Sons.
6. Zeegen, L. (2005). *The fundamentals of illustration*. Ava Publishing.

URL:-

5. https://blog.prototypr.io/10-basic-principles-of-visual-design-55b86b9f7241
6. https://www.canva.com/learn/design-elements-principles/
7. https://www.interaction-design.org/literature/topics/gestalt-principles
8. https://uxdesign.cc/psychology-design-4-gestalt-principles-to-use-as-your-next-design-solution-fcdec423a6bf

Course: Open Elective-2: Design Anthropology: Humanizing Technology for Society

C: L: T: P :: 3:1:2:0

1. Course Brief:

Design Anthropology is a way to uncover social aspects of user experience. It is the study of how design translates human values into tangible experiences. Design Anthropologists are super-empathetic designers, who provide solutions for both diverse and specific audiences. Socially, Anthropology applied means enabling more inclusivity, by better understanding differences in people and cultures.

2. Learning Objective:

- To understand elements of sociality, culture and belief systems of ethnic user group
- To apply the socio-cultural knowledge to design a system or product for a specific ethnic user group

3. Course Contents:

A. Theoretical

- Definition of Design Anthropology
- Symbolic meanings, and forms of sociality
- Socio-cultural Factors and its effects on User Acceptance
- Concept of Inclusivity
- Contextual Design and User ethnographic research
- Sustainability and User Behavior

B. Practical/Tutorial

A student has to conduct a user ethnographic research and identify the socio-cultural factors affecting user experience of a specific group of target users in some product use context.

4. Course Outcomes

CO1: Students will gain knowledge about fundamentals of Design Anthropology

CO2: Students will understand scope of applications of the ethnographic research in user interface and user experience design

Table: Correlation of POs v/s COs

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3	PSO 4
CO1	3	1	3	3	1	1	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	1	1	1	1	3	1	1	3	3	2	3	2

5. Prerequisites and Materials

- Students should have basic understanding of human thought process and cultural values.
- Basic soft skill on illustration and presentation skill might be required for this course.

Reference Books:-

1. Gunn, W., Otto, T., & Smith, R. C. (Eds.). (2013). *Design anthropology: theory and practice*. Taylor & Francis.

2. Benz, P. (Ed.). (2014). *Experience design: concepts and case studies*. Bloomsbury Publishing.
3. Preece, J., Rogers, Y., & Sharp, H. (2004). *Interaction design*. Apogeo Editore.
4. Benyon, D. (2014). Designing Interactive Systems: A comprehensive guide to HCI, UX and interaction design, 3/E.

URL:-

9. https://www.beingguided.com/blog/design-anthropologists
10. http://ethnographymatters.net/
11. https://www.epicpeople.org/

Course: Cognitive Ergonomics-II: Tools & Technique C: L: T: P :: 3:1:0

1. Course Brief:

Cognitive ergonomics (also known as cognitive human factors) is a fundamental subject of study under interaction design programme as study of user behavior is very important to design user interface and to decide upon interaction styles. Interaction styles have direct impact on user emotions and satisfaction and thus user experience.

2. Learning Objective:

1. To learn tools & techniques of cognitive ergonomics
2. To understand the scope of applications of principles of cognitive ergonomics in design

3. Course Contents:

A. Theoretical

- Cognitive Walk-through
- Think Aloud protocol and Measures of User Efficiency
- NASA-TLX for measurement of Cognitive Workload

B. Practical/Tutorial

A student has to pursue following assignments –

1. Monitoring user efficiency and problems using think aloud
2. Monitoring Cognitive Workload using NASA-TLX

4. Course Outcomes

CO1: Students should gain skills on tools & techniques of cognitive ergonomics

CO2: Students should able to apply these tools to identify system related problems and evaluation of interfaces

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	1	1	1	1	3	1	1	3	3	2	3	2

5. Prerequisites and Materials

- Students should have basic understanding of human behaviour and analysis.
- Basic soft skill on illustration and presentation skill might be required for this course.

Reference Books:-

1. Long, J., & Whitefield, A. (Eds.). (1989). *Cognitive ergonomics and human-computer interaction* (Vol. 1). Cambridge University Press.
2. Gaines, B. R., & Monk, A. F. (2015). *Cognitive Ergonomics: Understanding, Learning, and Designing Human-Computer Interaction*. Academic Press.
3. Hollnagel, E. (Ed.). (2003). *Handbook of cognitive task design*. CRC Press.
4. Rubin, J., & Chisnell, D. (2008). *Handbook of usability testing: how to plan, design and conduct effective tests*. John Wiley & Sons.
5. Stanton, N. A., Salmon, P. M., Rafferty, L. A., Walker, G. H., Baber, C., & Jenkins, D. P. (2017). *Human factors methods: a practical guide for engineering and design*. CRC Press.

URL:-

12.www.dsource.in/course/introduction-cognitive-ergonomics-design
13.https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20000021488.pdf

Course: Prototyping of User Interface **C: L: T: P:: 4:1:2:2**

1. Course Brief:

Designing user interfaces has been popular since the advent of personal computers, digital games and graphical user interfaces. Practitioners have taken it to sufficient maturity in terms of standards and collaboration and processes. This course will allow students to learn these facets and create prototypes to demonstrate how user interfaces are intended to work – as low fidelity and high-fidelity prototypes. Latter will involve exploring visual design and style elements of a user interface. Former will focus on wire-framing, navigation. Both will be based on good understanding of users as personas and corresponding user journeys. Secondly, a good user interface design needs to be validated by testing with users and students will get acquainted with several testing methodologies that deal with usability and validation, especially against a variety of form

factors. Lastly, students will need to understand related processes, especially from software engineering such as waterfall, agile methodologies of software development to help align their design processes with business processes (functional requirements) and technical architectures, which together address feasibility aspects of a user interface design.

2. Learning Objective:

- Familiarize with nuances of user interface design for various platforms/devices in different contexts.
- Understand various cognitive and usability aspects that make a good user interface.

3. Course Contents:

A. Theoretical

- Introduction and Overview
  - What if UI and UX design?
- Concept of Usability - definition and elaboration
- GUI Design and Aesthetics
- UI Design Process
  - Prototyping Techniques: Wireframes, Low-fidelity prototypes, High-fidelity prototypes, a quick glance on information architecture
- Planning and representation of interface using UML diagrams (Activity, Sequence, Use Cases)
- Usability evaluation of prototypes
- User Interfaces beyond screens
  - Designing for AR/VR
  - Voice Users Interfaces
  - Gestural Interfaces

B. Practical

Students will involve in small assignments and hands-on activities. These include:

- Translating user research data into information architectures, wireframes and UMLs.
- Lo-Fi and Hi-Fi prototyping of UIs

4. Course Outcomes

CO1: Students will understand the difference between UI and UX.

CO2: Understand fundamentals of UI design and various usability principles of good interface design.

CO3: Be able to utilize user research techniques to prototype and evaluate UIs for various contexts.

5. Prerequisites and Materials

f) Familiarity with UCD approach and various Design methods
g) Knowledge of various UI prototyping software.
h) Ability to conceptualize novel interfaces.

Table: Correlation of POs v/s COs

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	1	1	1	1	3	1	1	3	3	2	3	2
CO3	3	1	3	2	1	1	1	1	2	1	1	3	3	1	3	2

Reference Books:-

1. Albert, W., & Tullis, T. (2013). Measuring the user experience: collecting, analyzing, and presenting usability metrics. Newnes.
2. Benyon, D. (2010). Designing interactive systems: a comprehensive guide to HCI and interaction design. Pearson Education.
3. Benyon, D., Turner, P., & Turner, S. (2005). Designing interactive systems: People, activities, contexts, technologies. Pearson Education.
4. Cooper, A., Reimann, R., Cronin, D., & Noessel, C. (2014). About face: the essentials of interaction design. John Wiley & Sons.
5. Fleming, J., & Koman, R. (1998). Web navigation: designing the user experience (p. 166). Sebastopol, CA: O'reilly.
6. Norman, D. (2013). The design of everyday things: Revised and expanded edition. Basic Books (AZ).
7. Saffer, D. (2010). Designing for interaction: creating innovative applications and devices. New Riders.
8. Bowman, D., Kruijff, E., LaViola Jr, J. J., & Poupyrev, I. P. (2004). 3D User interfaces: theory and practice, CourseSmart eTextbook. Addison-Wesley.
9. Nielsen, J., & Molich, R. (1990, March). Heuristic evaluation of user interfaces. In Proceedings of the SIGCHI conference on Human factors in computing systems (pp. 249-256). ACM.

URL:-

1. https://www.iitg.ac.in/cseweb/vlab/creative-design-prototyping/index.html
2. https://nptel.ac.in/syllabus/syllabus.php?subjectId=106103115
3. https://www.nngroup.com/articles/ten-usability-heuristics/

Course: Task Analysis and System Modelling C: L: T: P :: 2:0:1:0

1. Course Brief:

Task analysis is the study of how people perform various tasks with existing systems. This course covers various methodologies used for user task analysis and how these methods can help in design or re-design of systems. System modelling is a way of representing systems abstracts through different user perspectives. Students will be familiarized with different system modelling techniques and their applications.

2. Learning Objective:

- Understand task analysis, system modelling techniques and related methodologies.
- Learn applications of task analysis and system modelling in real-world context.

3. Course Contents:

A. Theoretical

- Introduction to Task Analysis
- Techniques for task analysis
    - Decomposition of tasks into subtasks
    - Taxonomic classification of task knowledge
    - Cognitive Task Analysis, Hierarchical Task Analysis, Task flow models
    - Sources of information – interviews, observations, existing documentations
- Using task analysis to design new systems
- Introduction to system modelling
    - System models – context models, interaction models, behavioral models
- Unified Modelling Language (UML)
- Use-case Diagrams, Sequence Diagrams, State Diagrams

B. Practical

- Task-flow Analysis of websites, mobile applications, physical systems.
- System modelling assignments

4. Course Outcomes

CO1: Students will understand and familiarize with the concept of Task Analysis (TA) and System Modelling (SM).

CO2: Gain practical understanding about various aspects of TA, SM and be able to utilize various tools to understand and analyze user tasks and related systems.

5. Prerequisites and Materials

i) Familiarity with UCD approach and various Design methods
j) Familiarity with software such as SPSS or R would be plus
k) Familiarity with Qualitative data analysis techniques - like content analysis.

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	1	1	1	1	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Reference Books:-

1. P. Marti (1996). HCI in Italy: Task-centred Design - Turning Task Modelling into Design, SIGCHI Bulletin, 28(3)

2. Paterno,F. (2000). Model-Based Design and Evaluation of Interactive Applications. London, Springer-Verlag.
3. Karat, J., Vanderdonckt, J., Abowd, G., Calvary, G., Carroll, J., Cockton, G., ... & Jacob, R. (2005). HUMAN-COMPUTER INTERACTION SERIES VOLUME 3.
4. Systems Modelling: Theory and Practice by Michael Pidd.

Course: Portfolio Creation and Presentation Skills C: L: T: P :: 2:1:1:0

1. Course Brief:

Portfolio creation is an important for students to showcase their work, skills, talents and interests in a field of study. Equally important is the skill to present or show the work. Portfolio creation and presentation skills course is intends to help students collate their work, arrange them in systematic manner, represent and present it among a vast audience of different background.

2. Learning Objective:

- Learn the art of showing the work, building portfolios and selecting right work.
- Learn to present work.

3. Course Contents:

Practical

a. Forming a body of work
b. Selection of work for portfolio creation
c. Self-branding
d. Documentation, reporting

e. Presenting the work

4. Course Outcomes

CO1: Learn how to make portfolios and present work to different types of audience.

Table: Correlation of POs v/s COs

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	3	1	1	3	3	2	2	3

Course: Design Project 2: Multimodal System and Interface Design C: L: T: P :: 6:0:1 12

1. Course Brief:

Students will work on selected project on multimodal systems. The aim is to help students familiarize with various multimodal interaction techniques by utilizing various interaction technologies. Students will learn about various input/ output interaction modalities, learn to design multimodal interfaces, create working prototypes and conduct user testing to validate their design. Projects can be undertaken individually or in groups. Students will be encouraged to select own topics based on their area of interest.

2. Learning Objective:

- To know and understand simple interaction design lifecycle model
- To know multimodal static/dynamic website/mobile app design and technology
- To gain project handling experience

3. Course Contents:

Practical

A student has to design multimodal static/dynamic website/mobile interface applying knowledge gained through all other courses in semester 3. Following steps of simple interaction design lifecycle may be useful to pursue the design project –

- Identify needs/ establish requirements (30% time of 30 days)
- Design (20 % time of 30 days)
- Build an Interactive Version (Should have Low Fidelity Prototype/ HiFi may be encouraged at this level) (30% time of 30 days)
- Evaluate + Redesign (if required) (20 % time of 30 days)

4. Course Outcomes

CO1: Students will understand multimodal systems and interaction techniques.

CO2: Learn to create working prototypes and validate their usability, utility and usefulness.

Table: Correlation of POs v/s COs

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	1	1	1	1	3	1	1	3	3	2	3	2

5. Prerequisites and Materials

- Students should have knowledge gained in the different courses under the current semester.
- Basic soft skills on illustration, presentation and prototyping might be required for this course.

Reference Books:-

1. Multimodal Systems - Elisabeth André and Jean-Claude Martin

2023-27

Year 3

Semester 5

Course: Notification and Dialogs Design C: L: T: P:: 2:0:0:4

In HCI, dialog plays an important role for communication between human and computer. In this course, students will learn about representation, modelling and analysis of dialog. Notification is an act of bringing something to user's notice. If not designed properly, these can become distractions for users that hinders with their experiences. This course covers basic principles that govern good notification and dialog design.

1. Learning Objective:

- Understand different types of dialogs, notifications and their context of user and ways of representing them to users.
- Learn about design considerations for designing good notifications and dialogs between the device interface and users.

2. Course Contents:

C. Instructions on-

- Dialog representation in different modalities (e.g., screen, voice user interface etc.)
- State transition networks
- Modelling complex dialogs
- Finite State Machine
- Overview of Notifications and its types
- Design considerations for a good notification design

D. Practical

- Drawing FSM models for real-world systems (for e.g.: Vending machines)
- A/B testing of designed notifications and dialogs

3. Course Outcomes

CO1: Students will understand and familiarize with the concepts of notifications and dialogs.

CO2: Gain practical understanding about various aspects of dialog design, no and be able to utilize various tools to understand, represent and user tasks and related systems.

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	1	1	1	1	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

4. Materials and Pre-requisite:

a) Knowledge of User Interface GUI design

Reference Books:-

5. P. Marti (1996). HCI in Italy: Task-centred Design - Turning Task Modelling into Design, SIGCHI Bulletin, 28(3)
6. Paterno,F. (2000). Model-Based Design and Evaluation of Interactive Applications. London, Springer-Verlag.

7. Karat, J., Vanderdonckt, J., Abowd, G., Calvary, G., Carroll, J., Cockton, G., & Jacob, R. (2005). HUMAN-COMPUTER INTERACTION SERIES VOLUME 3.
8. Systems Modelling: Theory and Practice by Michael Pidd.

Course: UI Guidelines and its Applications C: L: T: P:: 2:0:1:2

1. Course Brief:

Interaction designers are designing system interfaces for different operating systems. Every operating system has different visual language for GUI. Therefore, it's better to aware of rules of designing GUI for different OS platforms such as Windows, Android, Mac OS etc. In addition, it's better to follow guidelines to design web-based interfaces to make it more user friendly. Sometimes a designer needs to follow the style guide of a specific company to express similar brand languages through the designed interfaces.

2. Learning Objective:

3. To learn different GUI related guidelines
4. To understand the scope of applications of GUI design guidelines in web-interface or OS or mobile application design

3. Course Contents:

A. Theoretical

- Importance of UI Guideline

- Web-Design Guidelines
- User experience guidelines for Universal Windows Platform (UWP) apps
- Google Material Design Guideline
- User Interface Guidelines (UICC-GUIDE-001, 1988)

B. Practical/Tutorial

A student has to pursue following assignments –

3. Designing UI layouts for Web-application
4. Designing UI layouts for mobile-application

4. Course Outcomes

CO1: Students should learn and gain knowledge on UI design guidelines

CO2: Students should able to apply this gained knowledge for interface design and evaluation.

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	3	1	1	2	3	2	2	3

CO2	3	2	3	3	1	1	1	1	3	1	1	2	3	2	3	2	

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Reference Books:-

1. Galitz, W. O. (2007). *The essential guide to user interface design: an introduction to GUI design principles and techniques*. John Wiley & Sons.

URL:-

1. https://www.ics.uci.edu/~kobsa/courses/ICS104/course-notes/Microsoft_WindowsGuidelines.pdf
2. https://material.io/design/guidelines-overview/#addition
3. download.microsoft.com/.../UWP%20app%20design%20guidelines%20v1509.pdf
4. https://www.comp.nus.edu.sg/~cs3249/lecture/GUI%20design.pdf

Course: Machine Learning for Designers C: L: T: P:: 2:0:1:2

1. Course Brief:

This course introduces Machine Learning (ML) and Artificial Intelligence (AI) through a human-centered design (HCD) perspective. The goal is to familiarize Designers and Artists with the various ML techniques for creative and design practices.

2. Learning Objective:

- To understand the use of AI and ML for improving user usability and utility in various contexts.

- To understand how to design AI for various contexts.

3. Course Contents:

A. Theoretical

- Introduction to Machine Learning and AI
- Why learn ML/ AI?
- Design and ML/ AI: Understanding the common grounds
- ML Classifiers and their applications
- Types of Classifiers
- Quick intro to Generative Adversarial Networks (GAN)
- AI in Art
- ML tools for Designers
- Teachable Machines, P5.js, other examples of non-coding platforms for AI/ML
- Case Studies

B. Practical

Students will involve in small assignments in form of hands-on activities and sessions. These include:

- Understanding the world around them and identifying crucial problems that can be solved through AI
- Conceptualize, brainstorm and prototype AI based solutions
- Utilizing ML for artistic expressions
- Programming ML experiences

4. Course Outcomes

CO1: Students will understand AI and ML and learn its applications through HCD approach.

CO2: Learn how to user various ML classifiers for different applications.

5. Materials and Pre-requisites:

Prerequisites: Basic understanding about computers science, Design thinking and Human-Centered Design. Programming and electronics prototyping skills will be a plus.

Course requirements: Webcam, sensors, Kinect, microcontrollers, workstation with good computation and storage capabilities, good internet connection.

Table: Correlation of POs v/s COs

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	2	1	1	1	3	1	2	3	3	2	2	3
CO2	3	2	3	3	3	1	1	1	3	1	2	3	3	2	3	2

Reference Books:-

1. Hurwitz, J. and Kirsch, D. (2018). Machine Learning for Dummies. (https://www.ibm.com/downloads/cas/GB8ZMQZ3)
2. Negnevitsky, Michael. Artificial intelligence: a guide to intelligent systems. Pearson education, 2005.
3. Chen, W., Shidujaman, M., Jin, J., & Ahmed, S. U. (2020, July). A Methodological Approach to Create Interactive Art in Artificial Intelligence. In International Conference on Human-Computer Interaction (pp. 13-31). Springer, Cham.
4. Yang, Q. (2018, March). Machine learning as a UX design material: how can we imagine beyond automation, recommenders, and reminders?. In 2018 AAAI spring symposium series.
5. 4. McCarthy, L., Reas, C., & Fry, B. (2015). Getting started with P5. js: Making interactive graphics in JavaScript and processing. Maker Media, Inc..

1. Course Brief:

Data driven design is a cutting age practice in the field of interaction design. This course will help students to analyze the collected user data. Computation of statistical parameter is beneficial to analyze user data. It is now possible to relate user data with user behavior. A designer could predict the acceptance of the system/product based on the data related to user behavior.

2. Learning Objective:

5. To learn statistical tools for data analysis
6. To understand the scope of applications of statistical tools for modeling of user behavior and software/ product acceptance.

3. Course Contents:

E. Theoretical

- Definition of Data Analytics
- Importance of Data Analytics and Statistics
- Descriptive Vs. Inferential Statistics
- Student –t tests and its alternatives
- Prediction Statistics: Correlation and Regression
- Introduction to Web Analytics
- Case studies on User Behavioral Modelling
- Case studies on Prediction of software/ product acceptance.

F. Practical/Tutorial

A student has to pursue following assignments –

5. Modeling of User Behavior from Website use Data / Social Media Data
6. Prediction of software/product acceptance based on user satisfaction/ empathy/ engagement/ enjoyment/ playfulness/ ease of use/ usefulness etc.

4. Course Outcomes

CO1: Students should gain skills on usage of statistical tools

CO2: Students should able to apply these tools to predict user acceptance and to design user's mental models.

Table: Correlation of POs and PSOs v/s COs

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3	3	1	1	1	1	3	1	1	3	3	2	2	3
CO2	2	2	3	3	1	2	1	1	3	1	1	3	3	2	3	2

Reference Books:-

1. Clifton, B. (2012). *Advanced web metrics with Google Analytics*. John Wiley & Sons.
2. Das, D., & Das, A. (1980). *Statistics in Biology & Psychology*. Academic publishers.
3. Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. sage.
4. Kaushik, A. (2007). *Web analytics: An hour a day (W/Cd)*. John Wiley & Sons.

URL:-

1. https://link.springer.com/journal/11257
2. https://www.predictiveanalyticstoday.com/best-user-and-entity-behavior-analytics-software/
3. https://searchsecurity.techtarget.com/definition/user-behavior-analytics-UBA
4. https://www.varonis.com/blog/what-is-user-behavior-analytics/

Course: Professional Elective 1 (Research Methods and Statistics in Design)

C: L: T: P:: 3:1:2 0

1. Course Brief:

Data driven design is a cutting age practice in the field of interaction design. This course will help students to analyze the collected user data. Computation of statistical parameter is beneficial to analyze user data. It is now possible to relate user data with user behavior. A designer could predict the acceptance of the system/product based on the data related to user behavior.

2. Learning Objective:

- To learn research methods for designing product/system
- To learn qualitative and quantitative research methods for user centric design
- To learn techniques for user data analysis, data interpretation and report writing

3. Course Contents:

G. Theoretical

- Introduction to User Research
- Types of Research
- User Research Techniques Vs. Research Methodology
- User Data Analysis
- Data Interpretation and Referencing Guidelines
- Research Report / Thesis Writing

H. Practical/Tutorial

A student has to pursue following assignments –

7. Data analysis with a sample user data
8. Identification of research type from multiple case studies

4. Course Outcomes

CO1: Students should learn research methods for designing product/system

CO2. Students should gain knowledge on techniques for user data analysis, data interpretation and report writing and apply it for the user research

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	3	2	1	1	2	3	1	1	3	3	2	2	3
CO2	2	2	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Reference Books:-

1. Blessing, L. T., & Chakrabarti, A. (2009). DRM, a design research methodology. Springer Science & Business Media.
2. Das, D., & Das, A. (1980). Statistics in Biology & Psychology. Academic Publishers.
3. Field, A. (2009). Discovering statistics using SPSS. Sage publications.

4. Kothari, C. R. (2004). Research methodology: Methods and techniques. New Age International.
5. Laurel, B. (2003). Design research: Methods and perspectives. MIT press.
6. Taylor, S. J., Bogdan, R., & DeVault, M. (2015). Introduction to qualitative research methods: A guidebook and resource. John Wiley & Sons.

URL:-

1. https://en.wikibooks.org/wiki/Research_Methods/Types_of_Research
2. https://research-methodology.net/research-methodology/research-types/

Course: Open Elective 3 (Service Experience Design) C: L: T: P:: 3:0:1:4

1. Course Brief:

Service design is all about strategy to design a service such a way that it meet the user or customer expectations or needs for this service. It can be used to improve an existing service or to create a new service from scratch.

2. Learning Objective:

- To learn principles of service experience design
- To apply these rules to design high quality services

3. Course Contents:

I. Theoretical

- Double Diamond Design Process for Effective Service Design (UK Design Council)
- Service Design Methods: User Journey Mapping, Empathy Mapping, Stake Holder Mapping, User Diaries, Service Safari, User Shadowing, User Personas and Scenarios, Brainstorming
- Service Prototyping Methods: Service Blueprinting, Role Play and Experience Prototyping

J. Practical/Tutorial

A student needs to pursue a short project on digital platform-based service experience design

4. Course Outcomes

CO1: Students should have clear understanding on scopes of application of service experience design

CO2: Students should able to apply tools and methods of service experience design for high quality services

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	1	3	3	2	1	1	2	3	1	1	3	3	2	2	3
CO2	2	2	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of design process and design methods.
- Basic soft skill on illustration and presentation skill might be required for this course.

Reference Books:-

1. Hunt, B., & Ivergard, T. (2014). *Designing service excellence: people and technology*. CRC Press.
2. Robert, C. (2017). *Service design: process & methods*
3. Robert, C. (2017). *Comprehensive step by step guide: Service blueprints: The tool for service innovation.*
4. Polaine, A., Løvlie, L., & Reason, B. (2013). *Service Design: From Insight to Inspiration*. Rosenfeld Media.

URL:-

1. https://www.interaction-design.org/literature/article/the-principles-of-service-design-thinking-building-better-services
2. https://www.designcouncil.org.uk/sites/default/files/asset/document/Design%20methods%20for%20developing%20services.pdf
3. https://www.designcouncil.org.uk/sites/default/files/asset/document/ElevenLessons_Design_Council%20(2).pdf

Course: Project 3: Professional Elective 2 (Designing Interactive systems for Social Needs)

C: L: T: P:: 6:0:2:8

1. Course Brief:

A system and its interface could be designed to address different social issues. These social issues include – traffic control, disaster management, clean country mission, social campaign, social event management, social sustainability, green energy management, Literacy Management, Poverty Management etc. Area of project might be –

a. Interactive system design to support clean India mission
b. Smart homes or cities for energy conservation

2. Learning Objective:

- To understand the scopes for applications of interaction design for social needs

3. Course Contents:

A. Practical

A student has to design a system and its interface applying knowledge gained through all other courses in semester 5. Following steps of usability engineering lifecycle may be useful to pursue the design project –

- **Requirement Analysis** (Identify user needs and problems, understand and specify context of use)
- **Design** (Bring multiple solutions for a selected problem, do screen design and build low fidelity prototype)
- **Testing** (Evaluated build low fidelity prototype through user testing)
- **Development** (Do detail design of the interface and build high fidelity prototype and evaluate it with users)
- **Installation** (Install the final solution and take user feedbacks for further improvement)

4. Course Outcomes

CO1: Students will understand the importance of social need.

CO2: Learn to design working prototypes of a system addressing a social need and validate their usability, utility and usefulness.

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	3	2	3	1	2	3	2	1	3	3	2	2	3
CO2	2	2	3	3	2	1	1	2	3	3	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of human behaviour.
- Basic soft skill on illustration, presentation and prototyping skills might be required for this course.

Reference Books:-

1. Murray, R., Caulier-Grice, J., & Mulgan, G. (2010). *The open book of social innovation* (p. 2). London: National endowment for science, technology and the art.
2. Damon, W. (1977). *The social world of the child* (p. 137). San Francisco: Jossey-Bass.
3. Aldrich, D. P. (2012). *Building resilience: Social capital in post-disaster recovery*. University of Chicago Press.

4. Hollnagel, E., Woods, D. D., & Leveson, N. (2007). *Resilience engineering: Concepts and precepts*. Ashgate Publishing, Ltd..
5. Hollnagel, E. (Ed.). (2013). *Resilience engineering in practice: A guidebook*. Ashgate Publishing, Ltd..

URL:

1. http://positivedisintegration.com/Betts1986.pdf
2. https://webarchive.nationalarchives.gov.uk/20171011142031/https://www.biglotteryfund.org.uk/research/emerging-social-need
3. https://www.wirtgen-group.com/en/wirtgen-group/social-commitment/akin-forum-49-magazin.php

Course: Project 3: Professional Elective 2 (Design for Special Need) C: L: T: P:: 6:0:2:8

1. Brief:

A system and its interface could be designed to address special needs of the users such as management of emergency health conditions, demonetization management, disaster management, assistive devices for special user population (e.g., Indian Military, Space Travelers) etc.

2. Learning Objective:

- To understand the scopes for applications of interaction design for special needs

3. Course Contents:

A. Practical

A student has to design a system and its interface applying knowledge gained through all other courses in semester 5. Following steps of usability engineering lifecycle may be useful to pursue the design project –

- **Requirement Analysis** (Identify user needs and problems, understand and specify context of use)
- **Design** (Bring multiple solutions for a selected problem, do screen design and build low fidelity prototype)
- **Testing** (Evaluated build low fidelity prototype through user testing)
- **Development** (Do detail design of the interface and build high fidelity prototype and evaluate it with users)
- **Installation** (Install the final solution and take user feedbacks for further improvement)

4. Course Outcomes

CO1: Students will understand the importance of special needs.

CO2: Learn to design working prototypes of a system addressing a special need and validate their usability, utility and usefulness.

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	3	2	1	1	2	3	1	1	3	3	2	2	3
CO2	2	2	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of human behaviour.

- Basic soft skill on illustration, presentation and prototyping skills might be required for this course.

Reference Books: -

- Beals, K., Dahl, D., Fink, R., & Linebarger, M. (2015). Speech and language technology for language disorders. de Gruyter.
- Axel Schmetzke, Elke Greifeneder, and Elke Greifeneder. Accessibility: Special Sections on Accessibility

URL:

5. http://positivedisintegration.com/Betts1986.pdf
6. https://webarchive.nationalarchives.gov.uk/20171011142031/https://www.biglotteryfund.org.uk/research/emerging-social-need
7. https://www.wirtgen-group.com/en/wirtgen-group/social-commitment/akin-forum-49-magazin.php
8. https://mashable.com/2012/01/11/kickstarter-social-good/#YQnwHD.tOSqE

Course: Venture Ideation (Online) C: L: T: P:: 2:2:0:0

1. Course Contents

> DO YOU HAVE IT IN YOU

Create an entrepreneurial peer network, Assess personal capacity for entrepreneurship, Analyze the impact of self-assessment results on entrepreneurial pursuits, Analyze entrepreneurial forms and processes, Assess characteristics of successful entrepreneurs, Explain differences between self-assessments and characteristics of successful entrepreneurs, Create a personal entrepreneurial action plan

> FINDING THE RIGHT OPPORTUNITY FOR YOU

Apply creative brainstorming techniques, Evaluate entrepreneurial opportunities, Evaluate whether entrepreneurial opportunities align with personal characteristics

> WILL YOUR IDEA WORK?

Create an elevator pitch for a product or service, Evaluate technical feasibility of a product or service

Develop measures of technical feasibility, Evaluate measures of technical feasibility, Create a prototype for an entrepreneurial opportunity, Evaluate entrepreneurial prototypes, Analyze intellectual property laws applicable to entrepreneurial pursuits

> WHO ARE YOUR CUSTOMERS?

Apply secondary market research resources to an entrepreneurial opportunity, Apply primary market research techniques for an entrepreneurial opportunity, Analyze market segmentation, targeting, and positioning for an entrepreneurial opportunity, Evaluate the market feasibility for an entrepreneurial opportunity

> WHO ARE YOUR COMPETITORS?

Analyze industry factors that influence the feasibility of an opportunity, Assess attractiveness of an industry using an industry analysis model, Evaluate product or service based on industry analysis

> WHAT DO THE NUMBERS TELL YOU?

Apply revenue forecasting techniques, Generate a pro forma income statement, Analyze a pro forma income statement for sensitivity, Evaluate income statement outcomes based on personal expectations and needs, Evaluate financial feasibility for potential ventures, Create a personal entrepreneurial action plan

> MORE THAN JUST AN IDEA

Create a business model for an entrepreneurial venture, Create a timeline for venture implementation, Analyze challenges associated with starting an entrepreneurial venture, Evaluate entrepreneurial business models, Create an executive summary for an entrepreneurial venture, Evaluate executive summaries for entrepreneurial ventures, Re-assess personal capacity for entrepreneurship

> INDIAN PERSPECTIVE

Entrepreneurship and Innovation in Indian context, Indian examples and learnings from them, Societal and Economical implications of starting a new business

Reference Books:-

Reading Material along with videos is available online to students through Blackboard

2023-27

Year 3

Semester 6

Course: Usability Engineering and User Testing C: L: T: P :: 3:1:2:0

1. Course Brief:

Usability plays an important role in the design of an interactive systems product life cycle from its beginning to end. It is an important measure of user experience and human limits and limitations. This course covers various usability methods, tools and techniques used for evaluation of interactive systems in terms of usability and user experience.

2. Learning Objective:

- Understand how to measure user usability and user experience.
- Understand underlying principles and heuristics for designing usable and useful interactive systems.

3. Course Contents:

A. Theoretical

- What is Usability and Usability Engineering?
- Usability Engineering Lifecycle.
  - Individual User Characteristics
  - Task Analysis, Functional and Competitive Analysis
- User Interface Generation
  - Designing interfaces for mobiles/ tablets
  - Conceptualizing next generation interfaces
- Usability Testing
  - Testing goals, plans, user, experiment design
  - Performance measurement

B. Practical

- User research, interviews, task analysis, heuristic evaluations,
- Usability testing of interfaces, A2B experiment

4. Course Outcomes

CO1: Students will learn about usability as a measure of user experience, usability engineering and various usability methods

CO2: Learn how to conduct usability studies and testing

5. Prerequisites and Materials

l) Understanding of UCD approach, Design, Design Process and Design Methods.
m) Eye-tracker, Physiological Measurement kit (GSR, EMG, ECG, Heart rate, BP).
n) Usability Testing setup with data recording and capturing (Audio/ Video Recorder).

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	2	1	1	2	3	2	1	3	3	2	2	3
CO2	2	3	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Reference Books:-

- Nielsen, J. (1994). *Usability engineering*. Morgan Kaufmann.
- Rubin, J., & Chisnell, D. (2008). *Handbook of usability testing: how to plan, design and conduct effective tests*. John Wiley & Sons.
- Barnum, C. M. (2020). *Usability testing essentials: ready, set... test!*. Morgan Kaufmann.

URLs:

- https://heatmap.com/#features
- https://app.gazerecorder.com/

- https://www.realeye.io/

Course: Portfolio Creation and Presentation Skills II C: L: T: P :: 3:0:2:2

1. Course Brief:

Portfolio creation is an important for students to showcase their work, skills, talents and interests in a field of study. Equally important is the skill to present or show the work. Portfolio creation and presentation skills course is intending to help students collate their work, arrange them in systematic manner, represent and present it among a vast audience of different background.

2. Learning Objective:

- Learn the art of showing the work, building portfolios and selecting right work.
- Learn to present work.

3. Course Contents:

K. Practical

a. Forming a body of work
b. Selection of work for portfolio creation
c. Self-branding
d. Documentation, reporting
e. Presenting the work

4. Course Outcomes

CO1: Learn how to make portfolios and present work to different types of audience.

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	0	1	0	1	3	0	0	3	3	2	2	3

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of design process and visual representation skills.
- Basic soft skill on illustration (Photoshop and Illustrator) will be required for this course.

Course: Professional Elective-3 (Semiotics of Digital Interfaces) C: L: T: P :: 3:1:1:2

1. Course Brief:

The HCI experts suggest that paying attention to interfaces elements should focus first of all on their understanding by users and only subsequently on their efficiency and effectiveness with respect to user goals/tasks. Therefore, we need to consider the semiotic aspects of different elements of the interface. During interface semiotics evaluation, interaction designers generally trying to address meanings expressed by different interface elements.

2. Learning Objectives:

- To understand the meanings conveyed through of each and every elements of the interface

- To identify the scopes of application of semiotic principles for user interface design

3. Course Contents:

A. Theoretical

- Definition of Semiotics and Semantics
- Definitions of Connotation and Denotation with examples
- Saussurean model of sign
- Peirce's Threefold Structure
- Sign, Symbol, Logo, Icon
- W-SIDE Evaluation Technique for systematically evaluate users' understanding of web interfaces
- Case Study on W-SIDE Evaluation Technique

B. Practical

- A student has to evaluate a web interface applying W-SIDE technique
- Students need to apply Saussurean model of sign and Peirce's Threefold Structure to evaluate icons for a GUI

4. Course Outcomes

CO1: Students will understand the Semiotics principles for interface design

CO2: Students will apply Semiotics principles for interface design and its evaluation

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	2	1	1	2	3	2	1	3	3	2	2	3
CO2	2	3	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisite and Materials:

- Students should have basic understanding of elements and principles of design.
- Soft skill on Adobe Illustrator and Adobe Photoshop will be required for this course.
- Students should install above-mentioned software in their PC/Laptop.

Reference Books:-

9. Speroni, M. (2006). *Mastering the semiotics of information-intensive web interfaces* (Doctoral dissertation, Università della Svizzera italiana).
10. Krippendorff, K. (2005). *The semantic turn: A new foundation for design*. crc Press.
11. Islam, M. N. (2014). Design and evaluation of web interface signs to improve web usability: a semiotic framework.

URL:

1. http://www.doria.fi/handle/10024/99021
2. https://core.ac.uk/download/pdf/20639304.pdf
3. https://www.museumsandtheweb.com/mw2006/papers/speroni/speroni.html

Course: Professional Elective-3 (Design Semantics) C: L: T: P :: 3:1:1:2

1. Course Brief:

The course introduces the students to the concept of product semantics, i.e., the symbolic qualities of man-made artifacts and their use. It covers psychological, social and cultural context of product and tries to understand the process of meaning making behind the product. Discussions will be placed on various categorization theory as a framework for product semantics to develop logical design approach to deal with product form meaning

2. Learning Objective:

- Understand the concept of semantics, semiotics and how they apply to product design.
- Understand the role of product affordance and metaphors for creating tangible interfaces.

3. Course Contents:

L. Theoretical

- Introduction of Semantics
  - What is Semantics and Semiotics?
  - Saussure's Model – Signifier and Signified
  - Symbols, Icons, Lexicons
  - Connotation and denotation
- Lakoff's Theory of Categorization.
- Gibson's Theory of Affordance.
- Classification of Affordance by Norman
- Meaning of Artifact in Use

M. Practical

The course is supported by short studio design projects

4. Course Outcomes

CO1: Students will learn about product semantics and its applications.

CO2: Understand how culture plays a role in product understanding of users.

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	2	1	1	2	3	2	1	3	3	2	2	3
CO2	2	3	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

o) Understanding of human-centered design, product design.

Reference Books:-

1. Lakoff, G: Women, fire, and dangerous things, University of Chicago Press, 1990
2. Krippendorff, K: Semantic turn: new foundation for design, Taylor and Francis, 2005
3. Vihma, S (ed): Semantic vision in design: symposium on design, University of Industrial Arts (UIAH), 1990
4. Gibson, E.J: Principles of perceptual learning and development, Appleton, New York, 1966 · Posner, Mol & Keele, S.W.: On the gene¬sis of abstract idea. Journal of Experimental Psychology, 1968, 77, 353-¬363
5. Rips, L.J, Schoben, E.J & Smith, E.F: Semantic distance and the verification of semantic relations, journal of verbal learning and verbal behavior, 1975, 14, 665¬681
6. Rosch, Mervis, Gray, Johnson & Boyes-BraemBasis objects in natural categories,
7. Cognitive psychology, 8, 383-435
8. Posner, M. I.: Abstraction and the process of recognition, in Bower and Spence eds, the psychology of learning
9. Athavankar, Uday A. "Categorization... natural language and design." *Design Issues* 5.2 (1989): 100-111.

Course: Open Elective 4
(Storytelling with Data: Visualization and Communication) C: L: T: P :: 3:3:0:0

1. Course Brief:

One of the key skills of a data scientist is the ability to tell a compelling story by visualizing data and findings in an approachable and stimulating way. Data visualizations are powerful and effective because people are better at analyzing patterns, trends, and correlations when presented in a graphic way, than if they are presented using numbers and text only. In this unit, you will explore data visualization principles, tools, and processes.

2. Learning Objective

- Explain the benefits of data visualization for an organization
- Explain tools and techniques used for data visualization
- Define data visualization terminology
- Identify data sets and useful variables for data visualization

3. Course Contents:

Data Visualization Basics

Characteristics of Data Visualization

Visual Perception and Cognitive Load

Applied Data Visualization

Exploratory and Explanatory Analysis

Dashboards and Storytelling

4. Course Outcomes

CO1: Identify variables that affect viewers' comprehension of data visualizations

CO2: Evaluate tools and techniques for storytelling with data and apply principles of effective communication

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	2	1	1	2	3	2	1	3	3	2	2	3
CO2	2	3	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Course: Open Elective 4 (Infographics) C: L: T: P :: 3:1:1:2

1. Course Brief:

Infographics (the word came from "information" and "graphics") are graphic visual representations of information, data or knowledge intended to present information quickly and clearly. It helps to improve understanding of an information by utilizing graphics to enhance the human visual system's ability to see patterns and trends.

2. Learning Objective:

- Understand how to create infographics to simplify the complex information for better understanding of target audience
- Understanding the scopes of application of infographics for user interface design.

3. Course Contents:

A. Theoretical

- Definition and History of Infographics (including Cartography)
- Elements of infographics
- Animated infographics
- Case Studies: Applications of Infographics for Digital media
- Case Studies: Applications of Infographics for UI design
- Case Studies: Applications of Infographics for Instructions design

B. Practical

- Designing infographics for social campaign in digital media
- Designing animated infographics for instruction design

4. Course Outcomes

CO1: Students will learn to create infographics.

CO2: Students will learn to apply infographics for different design solutions

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	0	1	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	0	1	1	1	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Skills of Adobe Illustrator and Photoshop.

Reference Books:-

1. Finke, T., & Manger, S. (2012*). Informotion: animated infographics*. Gestalten Verlag.
2. Shaoqiang, W. (2017). *Infographics: Designing & Visualizing Data*. Promopress.
3. Rendgen, S., & Wiedemann, J. (2014). *Understanding the world: The atlas of infographics*. Taschen.

Course: Open Elective 5 (Tangible Interface Design) C: L: T: P :: 3:1:1:2

1. Course Brief:

This course provides an integrated approach to students by combining engineering with creative design practices. The goal is to prepare students to become hybrid practitioners and collaborators in the field of emerging media. The course provides a mix of engineering and computer science along with artistic skills and design experience.

2. Learning Objective:

- Understand how to create interactive media using electronics and other computation mediums.
- Understand the role of product affordance and metaphors for creating tangible interfaces.

3. Course Contents:

C. Theoretical

1. A quick glance at Interaction Design principles
2. Introduction to Tangible User Interfaces (TUIs)
3. Tangible Interfaces Design Cases
4. Framework for TUI
    a. Tangible User Interface Modelling Language (TUIML)
    b. Hornecker-Burr Tangible Interaction Framework
    c. Reality-Based Interaction Framework

4. Enabling technologies for Tangible Interfaces

5. Theme overview and brainstorming techniques
6. Prototyping tools and techniques
    a. Low fidelity, High fidelity prototypes
    b. Prototyping tools
    c. Proof-of-concept prototyping, Functional Prototyping

D. Practical

- Interactive Prototyping

7. Course Outcomes

CO1: Students will learn to create and connect engineering practices with creative design practices.

CO2: Develop hands-on skill in prototyping interactive tangible interfaces.

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	3	3	1	2	3	2	1	3	3	2	2	3
CO2	2	3	3	3	3	3	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

8. Prerequisites and Materials

p) Knowledge in electronics and programming is a necessary.
q) A creative mindset that connects dots and knowledge from different fields. An inter – disciplinary approach towards Design would be a big plus.
r) Some programming skills would be good.

s) Prototyping electronic circuits will be a plus. Some enthusiasm towards Arts will also be appreciated. Knowledge about Design, Design Methods and Processes.
t) Keeping up with new trends and emerging technologies will help you go a long way – creatively and technically.
u) A full-fledged electronics lab with Arduinos, Makey-makey kits, Wires, DC power supply, LEDs, Electronic components, some mechanical kits containing gears, assembly-disassembly kit.

Reference Books:-

1. Tangible Bits: Towards seamless interfaces between People, Bits and Atoms. (1997). Hiroshi Ishii and Brygg Ullmer.
2. Tangible User Interfaces: Past, Present and Future. 2010. Eva Hornecker.
3. Foundations and Trends: Tangible User Interfaces. 2010. Eva Hornecker
4. R. J. K. Jacob et al., Reality-Based Interaction: A Framework for Post-WIMP Interfaces. 2008.
5. E. Hornecker and J. Buur, “Getting a Grip on Tangible Interaction: A Framework on Physical Space and Social Interaction,” 2006.
6. B. Ullmer and H. Ishii, “Human-Computer Interaction in the New Millenium,” 2001.
7. “Tangible Interfaces: Beyond Pixels, Towards Radical Atoms.”
8. C. Ratti, Y. Wang, H. Ishii, B. Piper, and D. Frenchman, “Tangible User Interfaces (TUIs): A Novel Paradigm for GIS,” 2004.
9. O. Shaer and R. J. K. Jacob, “A Visual Language for Programming Reality-Based Interaction,” in Visual Languages and Human-Centric Computing (VL/HCC’06), 2006, pp. 244–245.
10. C. Moussette, “Tangible interaction toolkits for designers.”

Course: Design Project 4 (Immersive Interface Design) C: L: T: P :: 6:0:4:4

1. Course Brief:

Students will work on select projects on immersive interface design such as AR/VR. The aim is to help students familiarize with various 3D interfaces and interaction techniques for AR/VR. Students will learn about prototyping AR/VR experiences, design 3D interfaces and conduct user testing to validate their design. Projects can be undertaken individually or in groups. Students will be encouraged to select own topics based on their area of interest.

2. Course Outcomes

CO1: Students will learn about AR/VR and designing their interfaces.

CO2: Learn to create working prototypes of AR/VR and validate their usability, utility and usefulness.

Table: Correlation of POs v/s COs

	Develop a creative	Empathy	Creative Articulation	Discovery and Realization	Design for Future	Inter-disciplinary Approach	Entrepreneurial Spirit	Cognitive Ergonomics and User Behavior	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	2	2	2	3	3	1	2	3	3	3
CO2	3	2	2	3	3	3	1	1	3	3	3

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

3. Prerequisites and Materials:

- Programming skills in C#, C++, 3D modelling
- High end workstation, Webcam, HCT Vice or Oculus Rift, Google Cardboard.

Reference Books:-

1. 3D User Interfaces - Dough Bowman

Course: Industrial Visit C: L: T: P :: 1:0:0:2

1. Course Brief:

This course aims at giving a hand on exposure to the way in which things are manufactured in a given industrial set up. The role of the student would be to observe and learn the production methods, and witness how mass production is handled.

The management will fix up the destination and it will be mandatory for each student to go there on self - finance basis.

The schedule is approximately 5 to 7 days, inclusive of the travel days by train.

2. Course Outcomes

CO1: Demonstrate understanding of manufacturing done in an Industry

CO2: Demonstrate understanding of design management

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	3	1	1	2	1	3	2	1	3	3	2	2	3
CO2	1	2	3	3	1	1	2	1	3	2	2	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2023-27

Year 4

Semester 7

B.Des_Interaction Design

Course: Design Strategies & Design Management C: L: T: P :: 3:3:0:0

1. Course Brief:

Managing design is important task for designers as it seek attention in every phenomenon related to the design. Design management starts from design awareness to management of design process to management of strategies of an innovation. A good design manager always work with cross-functional team to manage all these afore said activities.

2. Learning Objective:

7. To learn fundamentals of design management
8. To understand the scope of applications tools of design management to manage design project

3. Course Contents:

N. Theoretical

- Definitions of Design and Innovation Management
- Collaborative Model for Design
- Leadership Qualities for a Design Manager
- Managing Strategy
- Managing Product/Service
- Manging Process
- Design Management Staircase and Design Management Maturity Grid
- Design Management Tools: SWOT, Competitive Bench Marking, Decision Matrix, etc.

O. Practical/Tutorial

A student has to pursue following assignments –

9. Present a case study on managing design and innovation applying different tools of design management

4. Course Outcomes

CO1: Students should gain knowledge on design management strategies

CO2: Students should able to apply tools of design management to manage design project

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	1	1	1	1	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of design process.
- Basic soft skill on illustration and presentation skill might be required for this course.

Reference Books:-

1. Kootstra, G. L. (2009). The incorporation of design management in today's business practices. An Analysis.
2. Best, K. (2006). *Design management: managing design strategy, process and implementation*. AVA publishing.

3. Stone, T. L. (2010). *Managing the Design Process-Implementing Design: An Essential Manual for the Working Designer*. Rockport Publishers.

URL:-

1. www.dsource.in/course/design-management/designing-management
2. https://www.ideou.com/pages/design-thinking

Course: Photography C: L: T: P :: 1:0:1:0

1. Course Brief:

Photographs are important medium to express thoughts to a particular context. Photographs are visual cue to the target audience and it helps them to perceive the information as a designer want to convey through images. Therefore, it is important to gain knowledge and skills on photography to get good quality photographs to use them in digital platforms where applicable.

2. Learning Objective:

- To learn principles of creativity and innovation
- To apply these rules of creativity for creative solutions for business and society.

3. Course Contents:

A. Theoretical

- Know your camera settings
- Principles of Photographic Composition: Unity, Balance, Proportion, Harmony, Contrast, Rhythm
- The Rule of Thirds
- Theme and Context of Photography
- Sensitizing to Lighting Environments and Backgrounds for Photography

B. Practical/Tutorial

A student needs to take photographs for -

- Website or Mobile app design
- Digital Campaign

4. Course Outcomes

CO1: Students should have clear understanding principles of photography

CO2: Students should able to gain hand-on-skills to take good quality photographs for certain theme or context

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	2	1	1	3	3	2	2	3
CO2	1	2	3	3	1	1	1	1	2	1	1	3	3	2	3	2

Table: Correlation of POs v/s COs

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of principles of design.

- Basic photo editing skill (e.g. Photoshop) be required for this course.

Reference Books:-

5. London, B., Upton, J., Stone, J., Kobre, K., & Brill, B. (1998). *Photography*. New York: Longman.
6. Breslow, N. (1991). *Basic digital photography*. Focal Press.
7. Tim, D. Fundamentals of digital photography
8. Anna, F. Behind the image: research in photography.
9. Nicky, M. Beginner's photography guide

URL:-

14. https://www.trentsizemore.com/2012/08/16/principles/
15. https://www.stuckincustoms.com/10-principles-of-beautiful-photography/
16. https://www.acs.edu.au/info/photography/photo-technique/principles-of-photographic-composition.aspx

Course: Professional Elective-4 (Instructional System Design) C: L: T: P :: 3:1:2:0

1. Course Brief:

The instructional systems also refer to e-learning systems in which all the teaching and learning activities are happening through an online platform. Instructional systems design (ISD) is beneficial for systematically designing, developing and delivering instructions and better learning experiences (both in digital and physical environment), in a consistent and reliable fashion towards an efficient, effective, appealing, engaging and inspiring acquisition of knowledge.

2. Learning Objective:

- To learn elements of instructional systems
- To apply the elements and principles Instructional design to design high quality e-learning platforms

3. Course Contents:

A. Theoretical

- Learning Theories (Habituation, Sensitization, Conditioning and Learning)
- Learning and Memories

- Hierarchical Approach to the Learning (Bloom's Taxonomy)
- Theories of Constructivism, Cognitivism and Behaviorism
- Learner Centred Design Approach and Learner Mapping Technique
- Formative and Summative Assessments
- Differences Between CMS, LMS and LCMS
- Models and Guidelines for E-Learning System Design

B. Practical/Tutorial

A student has to perform small assignments to designing an e-learning system applying theories of learning and instructional design.

4. Course Outcomes

CO1: Students will gain knowledge about learning theories and elements of instructional design

CO2: Students will learn to design e-learning system / instructional system applying the knowledge of instructional design

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	2	1	1	2	3	2	1	3	3	2	2	3
CO2	2	3	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of elements and principles of interface design.
- Soft skill on Adobe Illustrator, Adobe Photoshop and Adobe XD will be required for this course.
- Students should install above-mentioned software in their PC/Laptop.

Reference Books:-

1. Smith, P. L., & Ragan, T. J. (2005). *Instructional design*. John Wiley & Sons.
2. Clarke, A. (2008). *E-learning skills*. Palgrave Macmillan.
3. Kapp, K. M. (2012). *The gamification of learning and instruction: game-based methods and strategies for training and education*. John Wiley & Sons.
4. Reigeluth, C. M. (Ed.). (2013). *Instructional design theories and models: An overview of their current status*. Routledge.

URL:-

1. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.645.7122&rep=rep1&type=pdf
2. http://csiss.org/SPACE/workshops/2007/UCSB/docs/ertmer_newby1993.pdf

UPES

Course: Professional Elective-4 (Instructions Design for Digital Products)

C: L: T: P :: 3:1:2 0

1. Course Brief:

Sometimes it is very difficult to use a complex product/software without either help of an instructor or instruction manual. Instructions to use a product are very helpful users to use a product with ease. There are digital product/ tools having complexity to use. Not only this, there are digital games where instructions play an important role to play the game or achieve different levels in a game.

2. Learning Objective:

- To learn elements and strategies of instruction design
- To apply the elements and principles Instruction design for ease of digital product use

3. Course Contents:

A. Theoretical

- Learning Theories (Habituation, Sensitization, Conditioning and Learning)
- Learning and Memories
- Hierarchical Approach to the Learning (Bloom's Taxonomy)
- Theories of Constructivism, Cognitivism and Behaviorism
- Learner Centred Design Approach for Instruction Design
- Instruction for Product Use: Tangible vs. Digital
- Case Studies on Instruction Design for Digital Products

B. Practical/Tutorial

A student has to perform small assignments to instruction design/ instructional manual design for digital products like-

- Complex software
- Digital Games
- Mobile app
- Web-application etc.

4. Course Outcomes

CO1: Students will gain knowledge about learning theories and elements of instruction design

CO2: Students will learn to apply the knowledge of instruction design for optimize use of digital products

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	2	1	1	2	3	2	1	3	3	2	2	3
CO2	2	3	3	3	2	1	1	2	3	1	1	3	3	2	3	2

Table: Correlation of POs and PSOs v/s COs

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Basic knowledge on infographics
- Soft skill on Adobe Illustrator, Adobe Photoshop and Adobe XD will be required for this course.
- Students should install above-mentioned software in their PC/Laptop.

Reference Books:-

5. Smith, P. L., & Ragan, T. J. (2005). *Instructional design*. John Wiley & Sons.
6. Clarke, A. (2008). *E-learning skills*. Palgrave Macmillan.
7. Kapp, K. M. (2012). *The gamification of learning and instruction: game-based methods and strategies for training and education*. John Wiley & Sons.
8. Reigeluth, C. M. (Ed.). (2013). *Instructional design theories and models: An overview of their status*. Routledge.

URL:-

3. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.645.7122&rep=rep1&type=pdf
4. http://csiss.org/SPACE/workshops/2007/UCSB/docs/ertmer_newby1993.pdf
5. http://www.theknowledgeguru.com/instructional-design-vs-learning-game-design-whats-difference/
6. https://indiewatch.net/2017/10/07/from-instructional-design-to-game-development-an-interview-with-ellen-johnson/
7. https://www.slideshare.net/becker/informing-so-tl-using-playtesting-techniques?next_slideshow=1
https://www.bluepay.com/sites/default/files/SwipeSimple_iOS_app_User%20Guide_(Vers

Course: Professional Elective-5 (Inclusive Design) C: L: T: P :: 3:0:2:2

1. Course Brief:

Inclusive design is the domain of design in which designers are designing an environment or a product so that it can be accessed and used by as many people as possible, regardless of age, gender and disability. The sector like smart cities, Indian rail etc. have huge requirements of inclusive design.

2. Learning Objective:

- To learn accessibility and usability aspects of design
- To learn the applications of inclusive design principles in different design contexts

3. Course Contents:

A. Theoretical

- Accessibility definition
- Accessibility and Usability
- Disability and Accessibility
- Individuality Vs. Accessibility
- Target group and modality of interactions
- Standard for Accessibility of Computing Systems: ISO 9241-20:2008; ISO/IEC 29136:2012, ISO 16071
- Elaborated study on Ergonomics of human-system interaction – guidance on software accessibility (ISO 16071)
- Case studies: Facility Design, Software Accessibility

B. Practical/Tutorial

A student has to understand the inclusion criteria for target users and they might provide solutions for –

a. Assistive devices required by the disabled persons

b. Design for healthcare of elderly

4. Course Outcomes

CO1: Students will gain knowledge about fundamentals of inclusive design

CO2: Students will understand scope of applications of the inclusive design principles in user interface design

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	2	1	1	2	3	2	1	3	3	2	2	3
CO2	2	3	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

B.Des_Interaction Design

- Students should have basic understanding of human behaviour and design process.
- Basic soft skill on illustration, presentation and prototyping skills might be required for this course.

Reference Books:-

1. Nicolle, C., & Abascal, J. (2014). *Inclusive design guidelines for HCI*. CRC Press.
2. Clarkson, P. J., Coleman, R., Keates, S., & Lebbon, C. (2013). *Inclusive design: Design for the whole population*. Springer Science & Business Media.
3. Myerson, J., & Lee, Y. K. (2010). *'Inclusive Design Research Initiatives at the Royal College of Art'Book in Universal Design Handbook*. McGraw-Hill Professional.

URL:-

17. http://www.inclusivedesign.no/practical-tools/definitions-article56-127.html
18. https://pdfs.semanticscholar.org/c0cd/c8cab74bbf5200fcd057dc05001f0e0fa5a2.pdf
19. https://uxplanet.org/6-principles-for-inclusive-design-3e9867f7f63e
20. https://idrc.ocadu.ca/about-the-idrc/49-resources/online-resources/articles-and-papers/443-whatisinclusivedesign

Course: Professional Elective-5 (Designing Interface for Infotainment System)

C: L: T: P :: 3:0:2:2

1. Course Brief:

Infotainment means broadcasting of material, which is intended both to entertain and to inform. Infotainment systems are the platform or device that helps to communicate infotainment to target audience. Infotainment systems are very profound in vehicles.

2. Learning Objective:

- To learn accessibility and usability aspects for infotainment system design
- To learn the applications of usability principles for infotainment system design

3. Course Contents:

A. Theoretical

- Elements of Infotainment System
- Accessibility and Usability aspects of Infotainment system
- Strategy of UI design for infotainment system
- Case Studies: Infotainment System Design of a Car

B. Practical/Tutorial

A student has to pursue a small assignment one of the following area –

c. Infotainment System Design of a Car
d. Infotainment System for Digital Campaign

4. Course Outcomes

CO1: Students will gain knowledge about fundamentals for infotainment system design

CO2: Students will understand scope of applications of usability and user interface design for Infotainment System Design

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	2	1	1	2	3	2	1	3	3	2	2	3
CO2	2	3	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of human thought process and design process.
- Basic soft skill on illustration, presentation and prototyping skills might be required for this course.

Reference Books:-

4. Benyon, D., Turner, P., & Turner, S. (2005). *Designing interactive systems: People, activities, contexts, technologies*. Pearson Education.
5. Camarinha-Matos, L. M., Afsarmanesh, H., & Erbe, H. H. (Eds.). (2013). *Advances in Networked Enterprises: virtual organizations, balanced automation, and systems integration*(Vol. 53). Springer.
6. Guo, H. (Ed.). (2009). *Automotive Informatics and Communicative Systems: Principles in Vehicular Networks and Data Exchange: Principles in Vehicular Networks and Data Exchange*. IGI Global.
7. Munro, A. J., Höök, K., & Benyon, D. (Eds.). (2012). *Social navigation of information space*. Springer Science & Business Media.
8. Nicolle, C., & Abascal, J. (2014). *Inclusive design guidelines for HCI*. CRC Press.

URL:-

1. https://www.bosch-mobility-solutions.com/en/products-and-services/commercial-vehicles/interior-and-body-systems/infotainmentsystems/
2. http://geosignage.com/?gclid=CjwKCAiA45njBRBwEiwASnZT59s3iZ3wJU4lB0BURbAj_slAClBFjMn6_y-TV-teSb49yC5SuBo-IRoCodMQAvD_BwE

Course: Open Elective-6 (Personalised and Adaptive Interfaces) C: L: T: P :: 3:1:1 2

1. Course Brief:

The idea of personalized and adaptive interfaces came from the requirement of users as user characteristics such as personality, gender, age group, emotions etc. differs time to time and from individual to individual. Personalized interfaces refer to the interface, which has been customized for a particular user or a particular group of user having same/similar characteristics. The definition of adaptive interface is – it is an interface that changes its layout and elements as per the needs of the user or context and is similarly alterable by each user.

2. Learning Objective:

9. To learn fundamentals of personalized and adaptive interface design
10. To understand the scope of applications of personalized and adaptive interface design

3. Course Contents:

A. Theoretical

- Definitions of personalized and adaptive interface
- Factors affecting personalized and adaptive interface: personality, gender, age group, emotions etc.
- Responsive vs. Adaptive Design
- Framework for Developing Adaptive Multimodal Applications
- Artificial Intelligence (AI) and Adaptive Design
- Mental Workload and Adaptive Interface

B. Practical/Tutorial

A student has to pursue following assignments –

10. Design of gender sensitive adaptive interface of a system.
11. Design of personalized interface based on emotions

4. Course Outcomes

CO1: Students should gain knowledge on personalized and adaptive interface design

CO2: Students should able to apply this knowledge to design personalized and adaptive interfaces

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	2	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	1	1	1	1	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of human thought process.
- Basic soft skill on illustration and presentation skill might be required for this course.

Reference Books:-

1. Brusilovsky, P., Kobsa, A., & Vassileva, J. (Eds.). (1998). *Adaptive hypertext and hypermedia*. Dordrecht: Kluwer Academic.
2. Oppermann, R. (2017). *Adaptive user support: ergonomic design of manually and automatically adaptable software*. Routledge.

3. Kirlik, A. (Ed.). (2006). *Adaptive perspectives on human-technology interaction: Methods and models for cognitive engineering and human-computer interaction*. Oxford University Press.

URL:-

1. https://www.ru.nl/publish/pages/769526/4447603_makris_nikos_-1a.pdf
2. https://www.sigir.org/files/museum/information_technology_research_and_development/1984_Vol03_No03/p162-mason.pdf
3. https://dl.acm.org/citation.cfm?id=1111481

Course: Design Project 5 (Minor Project) C: L: T: P :: 6:0:1:10

1. Course Brief:

Students will work on select projects on of their own choice. The aim is to help students to apply gained knowledge for executing a minor project dealing with real world problem.

2. Course Outcomes

CO1: Students will learn about various design methods.

CO2: Identify and work on real-world problem and provide creative solutions for the same.

Table: Correlation of POs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	2	1	1	2	3	2	1	3	3	2	2	3
CO2	2	3	3	3	2	1	1	2	3	1	1	3	3	2	3	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2023-27

Year 4

Semester 8

Course: Graduation Project C: L: T: P :: 15:0:0:30

1. Brief:

Dissertation project is a final interaction design project in the programme curriculum. A student need to have practical and field study related experience in this project. Student might pursue this project either in the industry or in the academic institution as per the opportunities available for the project. Persuasion of this project is mandatory for partial fulfilment of bachelor of design (B.Des.) programme. Students generally have opportunity to apply their theoretical learnings directly into real life scenarios (as a live project).

2. Learning Objective:

- To know and understand scope of the project
- To gain project handling experience
- To prepare assets for the development of software

3. Course Contents:

P. Practical

Following steps of simple interaction design lifecycle may be useful to pursue the design project –

- Identify needs/ establish requirements
- Design
- Build an Interactive Version (Low Fidelity Prototype may be encouraged at this level)
- Evaluate
- Redesign (if required)

4. Course Outcomes

CO1: Student should able to apply gained knowledge from other 7 semesters in their design project

CO2: Student should able to examine the scope of new design under design project

CO3: Student should able to justify the reason for selection of a design problem or solution

CO4: Student should able to formulate unique/novel/new and effective solution against certain design problem.

Table: Correlation of POs and PSOs v/s COs

PO & PSO Vs CO	Develop Creative Mind-set	Empathy	Creative Articulation	Discovery to Realization	Design for Future	Multi-Disciplinary Approach	Entrepreneurial Sprit	Teamwork	Professional Ethics	Sustainable Solutions	Local and Global Context	Lifelong Learning	Cognitive Ergonomics and User Behavior Modeling:	Information and System Design	Interaction and Navigation Design	User Interface Design
PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	3	1	1	1	1	3	1	1	3	3	2	2	3
CO2	3	2	3	3	1	1	1	1	3	1	1	3	3	2	3	2
CO3	3	1	3	2	1	1	1	1	2	1	1	3	3	1	3	2
C04	1	2	3	3	2	3	2	2	2	2	2	1	1	2	2	2

0: No Relation 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

5. Prerequisites and Materials

- Students should have basic understanding of human thought process and design process.
- Basic soft skill on illustration, presentation and prototyping skill might be required for this course.

Reference Books:-

4. Benyon, D., Turner, P., & Turner, S. (2005). Designing interactive systems: People, activities, contexts, technologies. Pearson Education.
5. Cooper, A., Reimann, R., & Cronin, D. (2007). *About face 3: the essentials of interaction design*. John Wiley & Sons.
6. Preece, J., Rogers, Y., & Sharp, H. (2015). Interaction design: beyond human-computer interaction. John Wiley & Sons.

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