Nirma University
Department of Design

B.Des in Industrial Design

Nirma University

Department of Design

Teaching & Examination Scheme of *(B.Des. programme)*

Revised

Semester I -A.Y. 2018-19

Sr. No.	Course Code	Course Title	Teaching Scheme (Total Hours) L	P	T	C	Examination Scheme Component Weightage CE	P	SEE
1	**DSK111**	Drawing - I		4.5		3	1.00		
2	**DSK112**	Geometric Construction 2D		4.5		3	1.00		
3	**DSK113**	Colour		4.5		3	1.00		
4	**DSK114**	Elements of Design I		4.5		3	1.00		
5	**DSK115**	Introduction to Basic Materials - I		4.5		3	1.00		
6	**DPR110**	Design Studio I – Design Enviornment		7.5		5	1.00		
7	**DTH111**	History of Design -I	1	1.5		2	1.00		
8	**DTH112**	Design Case Studies	1	1.5		2	1.00		
		Total	2	33		**24**			

SEE: *Semester End Examination / Jury*

L: *Lectures, P/T: Practicals-Studio/Tutorial, C: Credits*

CE: *Continuous Evaluation*

LPW: *Laboratory / Project Work / Studio Work*

***** *Field Course: Students will work a minimum of 8 hours each day at whichever site they are.*

Nirma University

Bachelor of Design, Department of Design

Year I, Semester I

L	T	P	C
		4.5	3

Course Code	**DSK111**
Course Title	**Drawing - I**
Credits	**4.5**
Teaching hours:	**67.5 hours**

Course Learning Outcomes (CLO):

This course helps develop a quality of keen observation and experience space in terms of perspective. Sharpens the ability to analyze and appreciate the structure that is either visible or hidden.

Helps understand the basics of drawing in terms of perception and representation of distance, concepts of 3D spaces and forms on 2D surface.

Helps establish a sense of inter-relatedness of parts in the overall proportion

Syllabus:

Basic Exercise

Movement of fingers, elbows and arms in drawing. Explore different grades of pencils, its properties and use. Representation of textures. Freehand plotting and layout.

Nature Drawing

Analysis and appreciation of natural form through a visual reference. Capturing of an overall form-character, overall proportions, and fine details. Understanding depth, light, and shade.

Human Figure Study

Overall human form study with the actual model, quick sketching to enhance observation. Human body details; understanding of form, relative proportions, and details by rendering techniques. **Dimensional Solids**

Drawing basic solid (cube/cone/sphere) and understanding its hidden dimension and structure in perspective.

Perspective Study

Simple one-point and two-point perspective of interior and exterior spaces. Complex perspective.

Suggested Readings^:

1. Dalley Terence ed; The complete guide to illustration & design, Phaidon, Oxford, 1980
2. T. C. Wang; Pencil Sketching, John Wiley & Sons, 1997
3. Pogany, Willy; The Art of Drawing, Publisher: Madison Books, 1996
4. R. Kasprin; Design Media –Techniques for watercolor, pen and ink,
5. Edwards, Betty; New Drawing on the Right Side of the Brain,

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

Nirma University

Bachelor of Design, Department of Design

Year I, Semester I

L	T	P	C
		4.5	3

Course Code	**DSK112**
Course Title	**Geometric Construction – 2D**
Credits	**3**
Teaching hours:	**67.5 hours**

Course Learning Outcomes (CLO):

Geometry (literally 'earth (geo) measure') is primarily a philosophical pursuit, along with arithmetic, Music & Astronomy, Geometry was one of the four obligatory educational studies in ancient times. It provides the tools, methods and vocabulary to giving tangible form to abstract ideas, which is the primary concern of Design.

It enables the analysis and description of shapes, patterns and their interrelationship.

It sensitizes designers to the hidden geometric order in natural forms, which can contribute significantly to their work

Syllabus:

Introduction to tools, Basic Concepts & Terminology, Shapes, Proportions, Series & Progressions, Symmetry, Tiling & surfaces

Suggested Readings^:

- Gail Greet Hannah, Elements of Design, Princeton Architectural Press, 2002
- Lauer, David; Design Basics, Wadsworth Publishing, 1999
- W. Wong; Principles of Two Dimensional Design, John Wiley and Sons, 1972
- J. Bowers; Introduction to Two Dimensional Design: Understanding Form and Function, John Wiley & Sons, 1999
- Proctor, R.M.; The principles of pattern,
- Dover Publications, 1990
- Elam, Kimberly; Geometry of Design: Studies in Proportion and Composition, Princeton Architectural Press, 2001

w.e.f. Academic year _2018 and onwards

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NIRMA UNIVERSITY

Department of Design

(B.Des.)

(1st Year / Semester 1)

L	T	P	C
		7.5	5

Course Code	**DPR111**
Course Title	**Design and Environment**

Course Learning Outcomes (CLO):

To understand the process of design and be able to find solutions to simple problems in our immediate environment. The focus is on being able to identify problems and find needs.

Syllabus: **Teaching hours**:112.5

Introduction to Design and its eco-system

Design Relevance: Exposure and analysis

Introduction to the process of Design

Inquiry and observations

Documenting activities and environments

Talking and conversing with users

Problem identification or need finding

Documentation, report making and presentations

Student put into practice what they have learnt in the other courses during the semester

Suggested Readings:

D. Norman; The Design of Everyday things, London, The MIT Press, 1998

A Forty; Objects of Desire, Thems & Hudson 1995

J. de Noblet ed., Industrial Design- Reflections of a century, Thames & Hudson, 1993

Julier, G.; 20th Century Design, Thames & Hudson, 1993

Potter, Norman; What is a Designer: Things, Places, Messages, Princeton Architectural Press, 2002

Victor Papanek, Design For the Real World

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w.e.f. academic year _2018_____ and onwards

NIRMA UNIVERSITY

Department of Design

(B.Des.)

(1st Year / Semester 1)

L	T	P	C
		4.5	3

Course Code	**DSK114**
Course Title	**Elements of Design I**

Course Learning Outcomes (CLO):

Be able to Communicate ideas and concepts by researching visual techniques

Be able to select visual communication techniques to realize creative intentions

Be able to produce work which demonstrates the use of visual communication

Syllabus: **Teaching hours**: 67.5

Exploration of parallel and curved lines,

Visualization of movement through lines

Exploration of edge & surface character and form of objects through lines

5 second progression

Gestalt and visual communication

Suggested Readings^:

Elements of Design: Rowena Reed Kostellow and the structure of visual Relationships (Design Briefs) Paper –Import, 1 July 2002

By Gail Greet Hannah

Design by Nature: Using Universal Forms and Principles in Design by Maggie Macnab

Universal Principles of Design, by Lidwell, Holden and Butler, Rockport, 2010

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w.e.f. academic year _2017_____ and onwards

NIRMA UNIVERSITY

Department of Design

(B.Des.)

(1st Year / Semester 1)

L	T	P	C
		4.5	3

Course Code	**DSK115**
Course Title	**Introduction to Basic Materials I**

Course Learning Outcomes (CLO):

Materials are one of the most basic resources for designers to give tangibility to their concepts and ideas. In this context it becomes important for them to understand the various kinds of materials that they can use, know their properties, the processes and the tools and their interrelationships required to work on them. New materials, processes and tools keep getting developed and it becomes relevant for the students to learn the method and pedagogy of understanding the materials, processes and the tools and techniques involved so that they can get confidence to work with any material, processes, tools and techniques known or new. It is also important for the students to develop sensitivity to experience the properties of different materials to get comfortable to interact with the world around filled with materials.

Syllabus: **Teaching hours**: 67.5

Introduction to basic forms - solid, sheet, clay and linear form.

Wood removal of material, understanding the grain structure and the form exploration. Sheet metal and plastic - shaping and forming, space filling possibility.

Clay - molding and shaping (pinching, slab work and coiling.)

Linear materials (rope, metal wire)- exploring tension properties. Techniques that can lead to surface and volume generation.

Introduction to hand tools across the workshops

Suggested Readings^:

- Basic Workshop Practice, Author Name: Kogent Learning Solutions Inc.
- Westermann Tables for the Metal Trade Book by John Wiley & Sons
- Workshop Technology Volume 1, 5th Edition by W. Chapman

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w.e.f. academic year _2017_____ and onwards

NIRMA UNIVERSITY

Department of Design

(B.Des.)

(1st Year / Semester 1)

L	T	P	C
1		1.5	2

Course Code	**DTH111**
Course Title	**History of Design - I**

Course Learning Outcomes (CLO):

Students of design need to engage with art and design history as a way of informing design practice as well as thinking. This course will introduce students to the breadth of art and design history from Indian as well as a Western perspective.

The objective of this course is to introduce students to historical developments in art and design against the background of major movements, styles and periods and with relation to social, cultural, economic, scientific and philosophical developments. The course will introduce students to Indian as well as Western perspectives in history and also introduce students to resources for studying history that will enable them in their own future investigations. It will cover historical developments until the Industrial Revolution in the 19th century.

Syllabus: **Teaching hours**: 37.5

Topic 1: Pre-history and Ancient Civilizations

Topic 2: Western Art and Design till Industrial Revolution

Topic 3: Indian Art and Design till Industrial Revolution

Topic 4: Industrial Revolution: the first machine age

Suggested Readings^:

L= Lecture, T= Tutorial, P= Practical, C= Credit

w.e.f. academic year _2017_____ and onwards

NIRMA UNIVERSITY

Department of Design

(B.Des.)

(1st Year / Semester 1)

L	T	P	C
1		1.5	2

Course Code	**DTH112**
Course Title	**Design Case Studies**

Course Learning Outcomes (CLO):

Learning about the many facets of design through a study of design case studies.

Design case studies will be selected from a wide range of design fields such as product, furniture, health, accessibility, UX, branding etc. The case studies will be a fair representation of Design in India as well as Design in the world outside.

Syllabus: **Teaching hours**: 37.5

Study and discussion of the case studies from different fields of design such as industrial design, product design, furniture design, graphic design, web design, textile design, sustainable design, eco design, etc.

The analysis of the case will be produced in a poster/ wall chart form

The students will submit a 1000-word paper at the end

Suggested Readings^:

www.designcouncil.org.uk

www.designinindia.net

www.dsource.in

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w.e.f. academic year _2017_____ and onwards

Nirma University

Department of Design

Teaching & Examination Scheme of *(B.Des. program)*

Proposed Semester II - A.Y. 2018-19 onwards

Sr. No.	Course Code	Course Title	Teaching Scheme (Total Hours)				Examination Scheme		
			L	P	T	C	Component Weightage		
							CE	P	SEE
1	DSK 121	Drawing - II		4.5		3	1.00		
2	DSK 122	Geometric Construction 3D		4.5		3	1.00		
3	DSK 123	Basic Typography		3		2	1.00		
4	DSK 124	Elements of Design II		6		4	1.00		
5	DSK 125	Introduction to Basic Materials II		4.5		3	1.00		
6	DSK 126	Imaging Techniques - Basic		3		2	1.00		
7	DPR 120	Design Process		4.5		3	1.00		
8	DTH 121	History of Design - II	1	1.5		2	1.00		
		Total	1	31.5		22			
*Field Courses									
9	DFO 120	*Rural Exposure & Documentation (Part of RSP)		40		2	1.00		
10	DFS 100	** Summer Apprenticeship		160 hrs		4	1.00		
		Total				2			
*Supplymentary Course									
10	DSP 120	Essential Communication		1		0	1.00		
		Total		1		0			
		Grand Total Credits	1	32.5		24			

				SEE: *Semester End Examination / Jury*						
	L: *Lectures, P/T: Practicals-Studio/Tutorial, C: Credits*			CE: *Continuous Evaluation*						
	LPW: *Laboratory / Project Work / Studio Work*									
	***** *Field Course: Students will work a minimum of 8 hours each day at whichever site they are.*									
	** Summer Apprenticeship Course Evaluation will be part of Semester III's T&E Scheme									

NIRMA UNIVERSITY

FOUNDATION PROGRAMME

Bachelor of Design, Department of Design

Year I, Semester II

L	T	P	C
		40	2

Course Code	**DFO120**
Course Title	**Rural Exposure & Documentation**

Course Learning Outcomes (CLO):

Design practice does not happen in isolation The environment, the society and culture provides the context within which design thrives and is created. A design student needs to empathize with the environment and experience the actual development of design at the grass root level. During this 1 week course the student would actually live in a rural environment and experience first-hand how design is practiced in reality.

Part two of this course is on campus where a detailed document is prepared of their observations and experience.

Suggested Readings:

1. Rajan Aditi, Handmade in India: Crafts of India 2009

w.e.f. Academic year _2017 and onwards

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NIRMA UNIVERSITY

FOUNDATION PROGRAMME

Bachelor of Design, Department of Design

Year II, Semester II

L	T	P	C
		160	4

Course Code	**DFS100**
Course Title	**Summer Apprenticeship**

Course Learning Outcomes (CLO):

This 4 week Summer Apprenticeship provides a comprehensive first exposure to professional workplace, to learn organization structure and function, to develop personality traits and to enhance communication and presentation (oral and written) skills.

Methodology

Orientation (up to four weeks) comprises design studio/ office visits and interaction with designers/ executives to facilitate the process of learning by observation and discussion, duly aided by the Checklist (an exhaustive list of queries about different aspects of an organization). Projects (often study type, involving collecting data, organizing, analyzing and presenting are assigned to promote leaning by doing. Components of evaluation include Dairy, Quiz, group discussion and presentation to develop regularity, group learning and communication skills.

w.e.f. Academic year _2017 and onwards

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NIRMA UNIVERSITY

FOUNDATION PROGRAMME

Bachelor of Design, Department of Design

Year I, Semester II

L	T	P	C
		6	4

Course Code	**DPR 120**
Course Title	**Design Process**

Course Learning Outcomes (CLO):

At the end of the course student will:

1. Understand the methodologies used in Design problem solving.
2. Be able to understand and apply Design Opportunity Mapping as an important aspect of Problem Solving.
3. Understand the critical and significant steps and stages of the process of arriving at a solution after rigorous analysis and synthesis of the date collected

Syllabus: **Teaching hours**:90

1. **Opportunity Mapping:**
   Reflecting on personal experiences in everyday life where a difficulty is perceived; identification of a problem & an opportunity to improve the situation as a designer.
2. **Study if User Environments:**
   Understanding User Environments where the problems are perceived; study of a several users to understand commonalities, distinct situations, behavioral, cultural, material indicators, contributing to the context.
   Introduction of various methods to understand the above-observation study, qualitative dialogue, questionnaire's, group discussions etc.
3. **Study of Object- Image Space:**
   Understanding the device, image system, service in question its construction, its function, its semantic value, embedded technology etc.
4. **Detailed Brief & Parameter Mapping:**
   Articulation of Detailed brief to evaluate solutions
5. **Rapid Ideations:**

Brain Storming Ideas, solutions, concepts, new ways of doing thing

6. **Final Solution & Prototyping:**
   Evaluation of solutions against parameters, selection of one idea fulfilling criteria, mock-up making, prototyping testing

Suggested Readings:

2. ***The India Report,*** *Charles & Ray Eames,* National Institute of Design Publications, 1958
3. ***Design & Environment****. Primer, H Kumar Vyas,* National Institute of Design Publications, 1952
4. ***Design The Indian Context****, H Kumar Vyas****,*** National Institute of Design Publications
5. ***Design The International Movement with Indian Parallel,*** *H Kumar Vyas,* CEPT University Publications, 2011
6. ***Thinking Design,*** *S Balaram, Sage Publications, 2011*
7. ***Design Your Life:*** *The pleasures and perils of Everyday Things, Julia Lupton, St Martin's Press, 12- May -2009*
8. ***The language of Things:*** *Understanding the world of Desirable Objects, Deyan Sudjic, W.W. Norton, 01 June 2009*
9. ***Evocative Objects:*** *Things we think with Sherry Turkle, MIT Press 2007*
10. ***Emotional Design:*** *Why we love for (or Hate)Everyday Things, Donald A. Norman, Basic Books, 2004*
11. ***The Design of Everyday Things,*** *Donald A Norman, Basic Books, 2001*

w.e.f. Academic year _2019 and onwards

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NIRMA UNIVERSITY

(B. Des- Industrial Design & Communication)

Bachelor of Design, Department of Design

Year I, Semester II

L	T	P	C
		1	0

Course Code	**DPS 120**
Course Title	**Essential Communication**
Credits	**0**
Teaching hours:	**15 hours**

Course Learning Outcomes (CLO)

At the end of the course, students will be able to:

1. Understand how communication process works

2. Develop effective speaking and writing abilities

3. Develop an ability to understand and deliver different kinds of writing

4. Effectively express

Syllabus:

- Types of Communication,
- Process of Communication
- Barriers to Communication
- Essentials of Good Communication
- Verbal and Non-verbal Communication
- Benefits of Effective Listening
- Basic grammar in spoken and written English
- Presentation Skills, Interviews, Public Speaking, Preparing the Speech

- Effective Writing Skills: Elements of Effective Writing, Writing of CV, Drafting an E-mail, Press Release, Report Writing etc

Suggested Readings:

1. *Effective English Communication* by Mohan Krishna, Meenakshi Raman
2. *The Definitive Book of Body Language: The Hidden Meaning Behind People's Gestures and Expressions*, by Barbara Pease, Allan Pease, Bantam Books, 2006
3. *Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Minds*, Carmine Gallo, St. Martin's Press, New York, 2014
4. *Essential Communication* by Ronald Adler, George Rodman, Athena du Pre, Oxford University Press, 2015
5. *Simply Said: Communicating Better at Work and Beyond*, by Jay Sullivan, Wiley, 2016

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w.e.f. academic year _2018_____ and onwards

NIRMA UNIVERSITY

FOUNDATION PROGRAMME

Bachelor of Design, Department of Design

Year I, Semester II

L	T	P	C
		3	2

Course Code	**DSK 123**
Course Title	**Basic Typography**

Course Learning Outcomes (CLO):

To understand and become sensitive to the use of type, type families and their variations. To do explorative printing on different surfaces.

Syllabus: **Teaching hours**:45

-Introduction to type and its history

-Type as a form and means of communication

- Type in our environment

- Learning to see and recognize typefaces, type families and know about type designers

- Construction of type with hand

- Structure and anatomy of type; x-height, ascenders, descenders, counter, cap-height, baseline etc.

-Typographic variables like kerning, tracking, leading, spacing etc

-Semantics of type, legibility and readability issues in type

-Introduction of printing techniques

Suggested Readings:

1. Carter Ron, Day Ben Meg Phillip, Typographic Design: Form and Communication, John Wiley & Sons 1999
2. Allen Hurlburt, The Grid, John Wiley & Sons 1999

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NIRMA UNIVERSITY

FOUNDATION PROGRAMME

Bachelor of Design, Department of Design

Year I, Semester II

L	T	P	C
		4.5	3

Course Code	**DSK 124**
Course Title	**Elements of Design II**

Course Learning Outcomes (CLO):

The course provides the students with design skills to generate newer form ideas, using the Principles of Design

The focus is to study this through 3 dimensional form manipulations in various media

The learning focus is also on Form Semantics, using various Elements of Design learnt in EOD I

Syllabus: **Teaching hours**:67.5

Nature & Form:

Study of a natural organism- flora or fauna; Simplification of the form to discover its key characteristics

Form & Movement:

Learning to create visual movement in a three dimensional form through principles of Form Integration

Form & Color:

Changing the characteristic of a Form through the use of Colour, Contrast, Edge Character,

Vantage Point, Orientation etc.

Suggested Readings:

1. **The Elements of Design**- Rediscovering Colours, Textures, Forms and Shapes, Authors Loan Oei & Cecile De Kegel Thames & Hudson 2002
2. **Elements of Design**: Rowena Reed Kostellow and the structure of Visual Relationships (Design Briefs) Author Gail Greet Hannah, Princeton Architectural Press 2002
3. **Notes on the Synthesis of Form** by Christopher Alexander, Harvard University Press

w.e.f. Academic year _2017 and onwards

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NIRMA UNIVERSITY

FOUNDATION PROGRAMME

Bachelor of Design, Department of Design

Year I, Semester II

L	T	P	C
		4.5	3

Course Code	**DSK 125**
Course Title	**Introduction to Basic Materials II**

Course Learning Outcomes (CLO):

The course objective is to introduce learners to natural and human created materials, techniques of construction and processes used to convert materials into forms

To discover properties of materials by 'doing'

Introduction to hand tools, their functions and their use.

Syllabus:

Teaching hours:45

Wood:

Learning all that is possible to do in wood-natural and synthetic-sawing, cutting, planning, drilling, chiseling, shaping, inlaying, molding etc.

Introduction to working on a wood lathe

Introduction to basic wood joineries

Metal:

Introduction to Wire & Rods- twisting, forging etc.

Introduction to Sheet Metal: Pressing, Bending, Forming, Shaping, Perforating

Introduction to Solid Rods: Lathe Work demonstration & making of a 'master' for casting/ molding (As part of field Visits)

Suggested Readings:

1. Handmade in India by Aditi and M P Ranjan, Mapin Publishers Pvt. Ltd, 2007
2. Understanding Wood: A Craftsman's Guide to Wood Technology by R. Bruce Hoadley, Taunton Press 2003
3. What wood is that? A manual of wood identification by Herbert Lesson Edlin, Viking Press, 1969
4. Identifying Wood: Accurate Resilts with simple Tools, by R Bruce Hoadley Tanton Press 1990
5. Wood: Identification and Use by Terry Potter, Guild of Master Craftsmen, 2004
6. Metal Techniques for Craftsmen: A basic manual on the methods of Forming and decorating Metals, by Oppo Untracht, Publisher: Robert Hale, 1985
7. Complete Metalsmith by Tim McCreight, Publisher: Davis 2005
8. Creative Metal Forming by Betty Helen Longhi, Cunthia Eid, Publisher: Brynmorgen Press 2013
9. The Art of Enameling: Techniques, Projects, inspiration by Linda Darty, Publisher: Lark Crafts, 2006
10. Metal Techniques of Bronze Age Masters: All Chained Up, By Victoria Lansford, Publisher: Spiral Publishing Inc, 2008

w.e.f. Academic year _2017 and onwards

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NIRMA UNIVERSITY

FOUNDATION PROGRAMME

Bachelor of Design, Department of Design

Year I, Semester II

L	T	P	C
		3	2

Course Code	**DSK 125**
Course Title	**Introduction to Basic Materials II**

Course Learning Outcomes (CLO):

Exposure and exploration of the fundamentals of photography

Syllabus: **Teaching hours**:45

-Exposure to element of photography

-Light a composition

-Framing and point of view

Suggested Readings:

1. Hegdecoe John, The Photographer's Handbook, Ebony Press London 1977
2. Scott Kelby, The Digital Photography Book
3. Graves, Carson; The elements of B& W Photography, Focal Press 2001
4. Ang. Tom; Digital photography, Mitchell Beazley 1999
5. Sontag Susan, On Photography, Picador 2001
6. Kelby Scott; The Digital Photography Book, Publisher; Peachit Press 2006
7. Grimm Michele & Grimm Tom; The Basic Book of Photography, Fifth Edition, Publisher: Plume, 2003

w.e.f. Academic year _2017 and onwards

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NIRMA UNIVERSITY

FOUNDATION PROGRAMME

Bachelor of Design, Department of Design

Year I, Semester II

L	T	P	C
		4.5	3

Course Code	**DSK121**
Course Title	**Drawing II**

Course Learning Outcomes (CLO):

In this course learner will be introduced to Analytical Drawing, where the focus is to understand the inherent structure and construction of natural and human created forms.

The course helps to evoke skills of representation learnt in Drawing I, through application of principles of principles of perspective. Various kinds of physical environments will be documented where elements bought together in time spatial frame – landscape, objects, people, flora and fauna, context, etc. Students will learn to document through sketches various environments, outdoors and indoors- work environments, living environments etc. and capture nuances of time, social and material character.

Syllabus: **Teaching hours**:67.5

Analytic drawing:

Understanding isometry:

Simple exercise of planes moving through space, drawn with the help of Isometric grid giving corner curvatures to planes, understanding circles as ellipse in isometric views

Form Transition & Form Generation:

Moving of form between different kinds of regular & semi-regular Polygons

Structures of Natural Objects:

Analysis of structure of natural forms- human body in motion, flora and fauna

Perspective Study

Representation of various environments recording time, space, motion and context

Suggested Readings:

1. Li: Dynamic Form in Nature by David Wade, wood Books, Walker, 2003
2. Golden Section by Scott Olsen, wooden Books, 2006
3. The Drawing Book: An innovative, practical approach to drawing the world around you, Author Sarah Simblet Penguin UK 2009
4. Jungle Trees of Central India: A field Guide for Tree Spotters, Author Pradip Krishen, penguin India 2014
5. Drawing: A Creative Process, Author, Francis D.K. Ching, New York : John Wiley & Sons, 1990.
6. Design Drawing, Author Francis D.K. Ching, Steven P. Juroszek Wiley 1997
7. The Sketchnote Handbook: the illustrated guide to visual note taking, Author by Mike Rohde Peachpit 2014
8. The Doodle Revolution: Unlock the Power to Think Differently, Author Sunni Brown, Portfolio 2014
9. Design by Nature: Using Universal Forms and Principles in Design (Voices that Matter), Author Maggie Macnab, New Ridders 2011

w.e.f. Academic year _2017 and onwards

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NIRMA UNIVERSITY

FOUNDATION PROGRAMME

Bachelor of Design, Department of Design

Year I, Semester II

L	T	P	C
		4.5	3

Course Code	**DSK122**
Course Title	**Geometric Construction -3D**

Course Learning Outcomes (CLO):

The course if focused on understanding the construction of 3 dimensional Polyhedrons with precision and skill

The course aims to make the learner understand mathematical properties of 3 dimensional dorms, their planes, angles, indices, axis and their current mathematical absolutes geometrically through the study of relationships of constituent parts

The course will also inculcate in the student the ability to analyze forms and their internal structures.

Syllabus: **Teaching hours**:67.5

Constructions of Polytrons:

Introduction to the construction of simple polytrons- tetrahedron, cube, octahedron, Dodecahedron, Icosahedron in paper and as frame structures

Tessellating Polyhedrons:

Introduction to construction of tessellating three dimensional polyhedrons like space lattices

Dissecting Polyhedrons:

Sections of Polyhedrons will be constructed to understand the interrelationships between all the regular polyhedrons

Crafting Innovative Tessellating 3 Dimensional Forms

Surface Planes of Polyhedrons will be evolved as distinct forms to tessellate with adjoining planes in Thermocol/PoP/ Clay etc.

The exercise can be then applied to space filling 3 dimensional, tessellating structures

Suggested Readings:

w.e.f. Academic year _2017 and onwards

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NIRMA UNIVERSITY

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Bachelor of Design, Department of Design

Year I, Semester II

L	T	P	C
1		1.5	2

Course Code	**DTH121**
Course Title	**History of Design II**

Course Learning Outcomes (CLO):

To introduce students to the philosophical, ideological and contextual circumstances within which Art, Architecture & Design movements flourished

To understand the visual language and vocabulary of various movements

To understand their cross- geographical reach and simultaneous connectedness

To understand their impact on the world and futures

Syllabus: **Teaching hours**:37.5

Topic 1: Design movements in the Occident

Topic 2: Design movements in the orient

Topic 3: World at the Turn pf 20th century movements

Topic 4: Design today & Furniture of design

Suggested Readings:

1. No more Rules: Graphic Design and Postmodernism by Rick Piynor, Laurance King Publishers; Reprint edition 2013

2. Postmodernism; Style and subversion, 1970-90, Edition by Glenn Adamson, Edited by Jane Pavitt, V & A Publishing 2011
3. The Design Way: Intentional Change In an Unpredictable World Erik
4. Stolterman and Harold G Nelson, MIT Press 2012
5. Towards Post Modernism: British Museum Press; Michael Colins, 1994
6. Design Since 1851, Michael Collins, British Museum Publ. 1987
7. Design of the 20th Century, Charlotte Fiell Peter Fiell Taschen 1999
8. History of Modern Design: Graphics and products since the Industrial Revolution. David Raizman, Laurance Kind Publishing 2003
9. The AZ of modern design, Bernd Polster Merrel 2006
10. Beginning Postmodernism, Tim Woods, Manchester University Press 1999
11. Radical Postmodernism; Architectural Design, edited by Charles Jencks and fat, Published by Wiley

w.e.f. Academic year _2017 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

Nirma University

Department of Design

Teaching & Examination Scheme of *(B.Des. Programme- Industrial Design)*

Semester III - A.Y. 2018-19 onwards

Sr. No.	Course Code	Course Title	Teaching Scheme (Total Hours)				Examination Scheme		
			L	P/S	T	C	Component Weightage		
							CE	P	SEE
1	**DSK 216**	Visualization & Representation I		4.5		3	1.00		
2	**DSK 217**	Elements of Form & Space- 2D		3		2	1.00		
3	**DSK 218**	Materials & Processes I - Metal & Wood		4.5		3	1.00		
4	**DSK 219**	Imaging Techniques II		3		2	1.00		
5	**DSK 220**	Introduction to Graphic Software		4.5		3	1.00		
6	**DTH 216**	History of Objects I	1	1.5		2	1.00		
7	**DTH 217**	Ergonomics 1	1	1.5		2	1.00		
8	**DPR 216**	Design Project I: Simple Product Design & Prototype Making		7.5		5	1.00		
		Total	**2**	**30**		**22**			
*** Field Courses**									
9	**DFS 100**	* Summer Apprenticeship - 4 Weeks		160 hrs		4	1.00		
		Total				**4**			
		Grand Total Credits				**26**			

L: *Lectures,* P/S: *Practicals-Studio, T:Tutorial,* C: *Credits*			**CE:** ***Continuous Evaluation+ Semester End jury (80%+20%)***						
LPW: *Laboratory / Project Work / Studio Work*									
**** Field Course: Students will work a minimum of 8 hours each day at whichever site they are***									
** Summer Apprenticeship: 1 Week = 40 hours = 1 Credit									

NIRMA UNIVERSITY

Industrial Design Programme

Bachelor of Design, Department of Design

Year II, Semester III

L	T	P	C
		4.5	3

Course Code	**DSK 216**
Course Title	**Visualization & Representation I**
Credits	**3**
Teaching hours:	**67.5 hours**

Course Learning Outcomes (CLO):

At the end of the course student will be able to:

1. Visualize and represent products and their components using various drawing methods
2. Draw Perspective, Orthographic and Axonometric views of products and their assembly
3. Communicate product construction and details through production drawings

Syllabus:

- Design Drawing: Drawing products and mechanisms illustrating 'construction and assembly': Drawing Simple Product's components & assembly like a spectacle, fountain pen, mobile phone, wheel barrow etc.
- Process Drawings: Diagrams illustrating process of construction
- Detail Drawings: Drawing technical mechanisms and details;
  Drawing Complex Mechanism's Components & Assembly like a cycle chain, brake details, seat assembly etc.

Suggested Reading:

1. *Design Drawing,* Francis D K Ching & Steven Juroszek
2. *Drawing for Product Designers,* Kevin Henry
3. *Drawing for Designers,* Alan Pipes

4. *Creative Metal Forming*, Betty Helen Longhi

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

NIRMA UNIVERSITY

Industrial Design Programme

Bachelor of Design, Department of Design

Year II, Semester III

L	T	P	C
		3	2

Course Code	**DSK 217**
Course Title	**Elements of Form & Space: 2D**
Credits	**2**
Teaching hours:	**45 hours**

Course Learning Outcomes (CLO):

At the end of the course students will be equipped to:

1. Generate and create new, 2 and 3 dimensional forms
2. Transform an existing natural form into newer forms using principles of simplification and stylization
3. Abstract forms and communicate its 'essence'

Syllabus:

With the use of drawing and modeling, students will generate new forms and learn to transform existing forms by:

- Generating forms through 'Simplification': Study of Realistic Flower, Plant or any other natural element-animate or inanimate
- Generating forms through 'Abstraction': Using Geometric forms and with application of corner and edge curvatures, radii manipulation and with the application of elements and principles of Design evolve further attributes in the forms
- Generating forms with 'Movement in Space': Evolving forms with movement of geometric forms in space

Suggested Reading:

1. The Elements of Design- *Rediscovering Colours, Textures, Forms and Shapes,* Loan Oei & Cecile De Kegel
2. *Elements of Design: Rowena Reed Kostellow and the Structure of Visual Relationships (Design Briefs),* Gail Greet Hannah
3. *Universal Principles of Design,* Lidwell, Holden, and Butler
4. *Drawing: A Creative Process,* Francis D.K. Ching,
5. *Design by Nature: Using Universal Forms and Principles in Design (Voices That Matter),* Maggie Macnab

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

NIRMA UNIVERSITY

Industrial Design Programme

Bachelor of Design, Department of Design

Year II, Semester III

L	T	P	C
		4.5	3

Course Code	**DSK 218**
Course Title	**Materials & Processes I - Metal & Wood**
Credits	**3**
Teaching hours:	**67.5 hours**

Course Learning Outcomes (CLO):

At the end of the course the student will be able to:

1. Create objects using techniques of 'casting, shaping and turning' metal
2. Make objects using advanced techniques for shaping natural and synthesized wood
3. Make a 'master' form for casting and/or make a mold.

Syllabus:

The course would focus on advanced explorations in wood and metal:

- Visits to various fabrication & production workshops producing sections, components, furniture, objects
- Workshop based assignments to use various techniques observed, to make forms

Suggested Reading:

1. *Materials for Design*, Chris Lefteri
2. *Metal Techniques for Craftsmen: A Basic Manual on the Methods of Forming and Decorating Metals*, Oppi Untracht
3. *Complete Metalsmith*, Tim McCreight,

4. Creative Metal Forming, Betty Helen Longhi, Cynthia Eid
5. *Understanding Wood: A Craftsman's Guide to Wood Technology*, R. Bruce Hoadley
6. *What wood is that? : A manual of wood identification*, Herbert Leeson Edlin
7. *Identifying Wood: Accurate Results With Simple Tools*, R. Bruce Hoadley
8. *Wood: Identification and Use*, Terry Potter

w.e.f. Academic year _2018 and onwards

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Nirma University

Industrial Design Programme

Bachelor of Design, Department of Design

Year II, Semester III

L	T	P	C
		3	2

Course Code	**DSK 219**
Course Title	**Imaging Techniques II**
Credits	**2**
Teaching hours:	**45 hours**

Course Learning Outcomes (CLO):

At the end of the course students will:

1. Use advanced techniques of photography to create photographic compositions.
2. Create narratives using single frames in continuity.
3. Document and communicate, processes of manufacturing and making.

Syllabus:

- Introduction to technicalities of Picture styles, RAW image, Digital imaging, Sensor, Crop factor, Light meter reading (Incident, reflected)
- Photography as contemporary Art
- Work of famous photographers
- Composition & Shooting at night
- Creating a body of work through Narrative photography

This would be learnt through:

- Outdoor Photography based on parameters of time, space etc.
- Live Photography of workshops, public spaces, factories, cottage industries - documenting processes, people at work and making
- Editing images to refine presentation of images

- **Suggested Reading**:

1. *Starting Photography*, Andrews, Philip & Langford,
2. *Light and Lens: Photography in the Digital Age*, Hirsch, Robert

3. *Photographic Composition: A Visual Guide*, Page, David A. & Zakia, Richard D.,
4. *Light Science and Magic: An Introduction to Photographic Lighting*, Hunter, Fil & Biver, Steven & Fuqua, Paul
5. *Perception and Imaging: Photography – A Way of Seeing*, Zakia, Richard D.,

w.e.f. Academic year _2018 and onwards

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NIRMA UNIVERSITY

Industrial Design Programme

Bachelor of Design, Department of Design

Year II, Semester III

L	T	P	C
		4.5	3

Course Code	**DSK 220**
Course Title	**Introduction to Graphic Software**
Credits	**3**
Teaching hours:	**67.5 hours**

Course Learning Outcomes (CLO):

The course equips students to:

1. Work proficiently with Graphic software currently in use in the Industry
2. Use advanced software for visual ideation, image creation and presentations
3. Be skillful in image editing and image enhancement

Syllabus:

The course will focus on presentation and graphic software such as Microsoft Office's Power Point Presentation, Adobe Suite's Photoshop, Illustrator & InDesign

- Introduction to various Software & its applications in Industry
- Introduction to various tools/commands and its versatility for purpose at hand
- Practical applications of Tools & Commands
- Creative visualization of layouts with text and images
- Creative Image creation

Suggested Reading:

1. *Adobe CC Classroom in a Book: 7 Books*
4. *The Adobe Photoshop CC Book for Digital Photographers 2017,* Scott Kelby
5. *Presentation Zen Design: Simple Design Principles and Techniques to Enhance Your Presentations,* Garr Reynolds
6. *Slide:ology: The Art and Science of Presentation Design,* Nancy Duarte

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

NIRMA UNIVERSITY

Industrial Design Programme

Bachelor of Design, Department of Design

Year II, Semester III

L	T	P	C
1		1.5	2

Course Code	**DTH 216**
Course Title	**History of Objects I**
Credits	**2**
Teaching hours:	**37.5 hours**

Course Learning Outcomes (CLO):

At the end of the course the student will:

1. Understand the co- relation between Form, Function and Technology in the creation of objects and devices
2. Comprehend the evolution of technical know-how and the use of technology to improvise
3. Research on the human impulse for critical thinking to innovate with objects, tools and devices

Syllabus: **Form, Function & Technology:**

To introduce students to what governs the development of objects:

- Geography and context of available materials,
- Needs of society; trade and expansion,
- Know-how and understanding of materials, technique and technology,
- Semantic meanings associated with the use and hence symbolic orientation with material, colour, form, ownership
- Inspirational principles and ideals associated with intangible attributes like power etc.

The course will combine visual lectures, which would include scholarly theoretical frameworks.

Learning would also be initiated through Individual assignments based on objects and their various functions. For example, Dry grinders, Juice Makers, Kettles, Roti making Devices, Oil containers & Dispensers, Ink Pots, Writing Instrument-Pens, Hammers etc.

Suggested Reading:

1. *Design and Environment: A Primer,* H. Kumar Vyas
2. *Design, the Indian Context: Learning the Historical Rationale of the Indian Design Idiom,* H. Kumar Vyas
3. *The Design of Everyday Things,* Don Norman
4. *Emotional Design*, Don Norman
5. *The Earthen Drum*, Pupul Jayakar

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credits

NIRMA UNIVERSITY

Industrial Design Programme

Bachelor of Design, Department of Design

Year II, Semester III

L	T	P	C
1		1.5	2

Course Code	**DTH 217**
Course Title	**Ergonomics I**
Credits	**2**
Teaching hours:	**37.5**

Course Learning Outcomes (CLO):

At the end of the course the students will:

1. Understand the human factors involved in Object- User Interface through theoretical and practical orientation
2. Become conversant with human comfort factors involved in the use of objects, devices and work environments
3. Comprehend and apply International norms and standards
4. Articulate variations/deviations based on ethnographic and cultural conditions

Syllabus:

- History of Ergonomics
- Study of body structure & skeleton
- Human Anatomy Study
- Understanding Anthropometric data of adult male & female and children's physical structures
- Human hand and skill functions
- Environmental Comfort levels for humans related to factors such as sound, temperature etc.

Lectures: Introduction to Ergonomics:

1. Study of human body and the structure
2. Study of human factors in Design
3. Study of Ergonomics in Design- 5^{th} to 95^{th} Percentile
4. Methods to study Products and aspects of ergonomic considerations

Suggested Reading:

1. *Measure of Man,* Henry Dreyfus
2. *Ergonomics (NID Publication),* Deb Kumar Chakrabarty

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Cred

NIRMA UNIVERSITY

Industrial Design Programme

Bachelor of Design, Department of Design

Year II, Semester III

L	T	P	C
		7.5	5

Course Code	**DPR 216**
Course Title	**Design Project I: Simple Product Design and Prototype Making**
Credits	**5**
Teaching hours:	**112.5 hours**

Course Learning Outcomes (CLO):

At the end of the course the student will be able to:

1. Design a simple product
2. Create a User-centered design based on User research
3. Prototype and test the product
4. Incorporate feedback received from Users and after Material testing

Syllabus:

- Introduction to Product Design
- Introduction to Product Design Process
- Product Analysis of selected product
- Study of existing product with reference to User needs & environment of Use
- Identification of issues with the existing product and stating new requirements to improve the product
- Design Concept Development and Iterations
- Final design Concept and presentation with details of manufacturing
- Final design prototype in 1:1 scale and User feedback

The inputs would be through lectures and presentations on:

- Industrial Design- an overview
- Presentation on Product design process
- Case study of known industrial designers and simple products

Suggested Reading:

1. *As little design as possible*, Dieter Rams
2. *Design for the real world*, Victor Papanek
3. *Design and environment*, H. Kumar Vyas
4. *Design: The Indian Context*, H. Kumar Vyas

w.e.f. Academic year _2018 and onwards
Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

Nirma University

Department of Design

Teaching & Examination Scheme of *(B.Des. Programme-Industrial Design)*

Semester IV / A.Y. 2018-19

Sr. No.	Course Code	Course Title	Teaching Scheme (Total Hours)				Examination Scheme		
			L	P/S	T	C	Component Weightage		
							CE	P	SEE
1	**DSK 226**	**Visualization & Representation II**		7.5		5	**1.00**		
2	**DSK 227**	**Elements of Form & Space- 3D**		4.5		3	**1.00**		
3	**DSK 228**	**Materials & Processes II - Plastics**		3		2	**1.00**		
4	**DTH 226**	**History of Objects II**	1	4.5		4	**1.00**		
5	**DTH 228**	**Ergonomics II**		1.5		1	**1.00**		
6	**DPR 226**	**Design Project II: Simple Mechanical Device & Prototype Making**	2	9		8	**1.00**		
		Total	3	30		23			
*** Field Courses**									
7	**DFS 200**	**Summer Apprenticeship- 6 Weeks****		**240 hrs**		6	**1.00**		
		Total				6			
***Supplementary Course**									
8	**DSP 200**	**Business Communication**		1		0	**1.00**		
		Total		1		0			
		Grand Total Credits	3	31		23			

L: *Lectures, P/T: Practicals-Studio/Tutorial, C: Credits*			**CE:** ***Continuous Evaluation+ Semester End jury (80%+20%)***						
LPW: *Laboratory / Project Work / Studio Work*									
**** Field Course: Students will work a minimum of 8 hours each day at whichever site they are***									
**** ***Summer Apprenticeship will be part of Semester V's Teaching & Examination Scheme***									

NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAM

Bachelor of Design, Department of Design

Year II, Semester IV

L	T	P	C
		6	4

Course Code	**DSK 226**
Course Title	**Visualization and Representation II**

Course Learning Outcomes (CLO):

At the end of the course the students will:

1. Be able to do Product renderings and will master presentation techniques
2. Be able to do three dimensional Visualization using software skills.
3. Be able to have an understanding and making of 3D exploded views of objects using 3D software.
4. Be able to use computers for 2 dimensional drafting

Syllabus: **Teaching Hours: 112.5**

1. `1. Introduction to Principles of light and shadow

- Introduction to principles of light and shadow lines, planes and simple solids due to near and distant sources of light.
- Rendering techniques using pen & ink, colour, values, tones etc.

2. Introduction to AutoCAD as 2D drafting tool

- Introduction to Digital drawing tools, drawing lines and shapes, modifying lines and shapes, drawing with accuracy and speed
- Representation of plan, elevation and section in product drawings, using software such as AutoCAD drawing and printing to scale
- Introduction to text styles and sizes, hatches and dashed lines, stencils and blocks, advanced editing tools and dimensioning drawings

2. Three Dimensional modeling using software

- Introduction to 3D-modelling techniques

- 3D basics: Axes, Planes and Faces
- 3D objects: Box, Wedge, Cone, Sphere, Cylinder, Cube and Pyramids
- 3D Object Modifications: Practice with tools -Rotate, Mirror, Array and Scale, 3D Boolean operations- Subtract, Intersect, Union etc.
- 3D Object Modifications: Practice with tools -Rotate, Mirror, Array and Scale, 3D Boolean operations- Subtract, Intersect, Union etc.
- Solid modeling: Revolve, Shell, Taper, Loft, Path extrusion, Sweep etc.

Suggested Readings:

1. Bhatt, N. D. (2003). *Engineering Drawing*, Charotar Publishing House, Anand
2. Dinsmore, G. A. (1968) *Analytical Graphics*, D.Van Nostrand, Company Inc., Canada
3. Holmes, J. M. (1954) *Applied Perspective*, Sir Isaac, Piotman and Sons Ltd., London
4. Norling, E. (1969) *Perspective drawing*, Walter Fostor Art Books, California
5. Robert, W.G. (2006), Perspective: from basic to creative. 1sr Ed., Thames and Hudson, London
6. Gindis, E. (2014), Up and Running with AutoCAD 2015: 2D & 3D Drawing and Modeling, Oxford: Elsevier
7. Seidler, D. R. (2007), Digital Drawing for Designers: A Visual Guide to AutoCAD 2012, Fairchild Publications, London
8. Tutorials: http://www.lynda.com/
9. Inside Rhinoceros by Ron Cheng

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAM

Bachelor of Design, Department of Design

Year II, Semester IV

L	T	P	C
		4.5	3

Course Code	**DSK 227**
Course Title	**Elements of Form & Space -3D**

Course Learning Outcomes (CLO):

At the end student will be able

- To work with new modeling materials.
- To generate and create, New 3 dimensional forms through process of abstraction, stylization using Gestalt and other design principles.
- To generate forms that require rationalization and added functional features like stackability, modularity etc.

Syllabus **Teaching hours**: **67.5**

Unit 1 Form development based on a conceptual theme **Teaching hours:21**

1.1 Based on an understanding of the relationship between Form and Nature

1.2 Three modelling of concepts generated

Unit 2 Ideation of forms based on Form and Space relationship **Teaching hours:21**

2.1 Demonstrating relationships between the internal void and external form of an object
2.2 Three modelling of concepts generated

Unit 3 Form development based on a functional parameter **Teaching hours:25.5**

3.1 Based on the relationship between Object and Human Body
3.2 Three modelling of concepts generated

Suggested Readings:

1. Biomimicry: Innovation Inspired by Nature by Janine M. Benyus
2. Process: 50 Product Designs from Concept to Manufacture by Jennifer Hudson
3. Prototyping and Model making for Product Design by Bjarki Hallgrimsson
4. Design of the 20th Century by Charlotte & Peter Fiell

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAM

Bachelor of Design, Department of Design

Year II, Semester IV

L	T	P	C
		3	2

Course Code	**DSK 228**
Course Title	**Materials & Processes II- Plastics**

Course Learning Outcomes (CLO):

At the end of the course the student will be

1. Equipped to understand plastics as a material, various compositions of plastics available currently and their application in current context
2. Understand methods of making consumer and industrial products using various manufacturing techniques for plastics

Syllabus: **Teaching hours**: **45**

Unit 1 Introduction to various kinds of plastics **Teaching hours**: **6**

Unit 2 Various methods of producing plastic goods **Teaching hours**: **24**

2.3 Injection Moulding, Extrusion Moulding, Blow Moulding
2.4 Dye Casting, Mould Making & Master making
2.5 Fabrication, Thermo- forming etc.
2.6 Documentation of various processes seen through Industry visits

Unit 3 Practice based studio work **Teaching hours**: **12**

3.1 Exploration & Fabrication of simple forms & objects using variety of processes, including bonding, carving, cutting, sticking, turning and welding

Unit 4 Plastics & Environment; issues of sustainable practice **Teaching hours**: **3**

Suggested Readings:

1. Plastic Dreams by Charlotte and Peter Fiell
2. Industrial Design Reference & Specification Book: Dan Cuffaro, Isaac Zaksenberg
3. I Am Plastic: The Designer Toy Explosion by Paul Budnitz

w.e.f. Academic year _2018 and onwards

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NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAM

Bachelor of Design, Department of Design

Year II, Semester IV

L	T	P	C
1		4.5	4

Course Code	**DTH 226**
Course Title	**History of Objects II**

Course Learning Outcomes (CLO):

At the end of the course student will:

1. Be able to identify indigenous technology, habitats and knowledge systems by way of survey, collection and documentation of the knowledge from primary and secondary sources.
2. Will have knowledge of the rich resources of materials, traditional methods of production and use of indigenous techniques and technology practiced in India.
3. Will know through visits, the indigenous technologies existing in different parts of India with focus on the city of Ahmedabad and surrounding towns.
4. Be exposed to evolution of objects through time, geographies, periods of aspirations, idealisms and period of 'Order & Chaos'.
5. Understand symbolism in the form and functional of objects, images, spaces and services.

Syllabus: **Teaching hours**: **82.5 hours**

The course would be conducted through the following

1. Lectures, Film Viewing, Museum Visits
2. Case Study presentations and Critique
3. Individual Research project & Colloquium paper writing
4. Documentation & Presentation

Unit 1 The history of objects **Teaching hours**: **24 hours**

1.1 Symbolism seen in tools, image systems, objects of daily use, objects for leisure & desire, objects of mass consumption, toys & games, typography etc.
1.2 Uniformity of the symbolism seen in a particular period across media, disciplines
1.3 Semiotics & embedded meanings of exclusion, inclusion, sexuality, gender identities, and philosophical meaning attributed to concepts of frugality, modernity, futurism etc. seen in objects.
1.4 Objects its evolution and its cultural context

Unit 2 Understanding the Cottage and MSME industries **Teaching hours: 30 hours**

2.1 Contextual processes of making the products function with available materials, methods and needs that is culture and context specific.

2.2 Identification of Cottage, Micro, Small & Medium industries in the city producing interesting and significant objects.

2.3 Visits to the units and documenting the processes

2.4 Understanding the value and supply chain, making digital visual models of these from Material to Market

Unit 3 Understanding legislation, GI registration etc. **Teaching hours: 6 hours**

3.1 Legislation related to the technologies being used

Unit 4 Documentation **Teaching hours: 22.5 hours**

Suggested Readings:

12. Handmade in India: A Geographic Encyclopedia of India by Aditi Ranjan (Editor), M. P. Ranjan (Editor)
13. Metal Techniques for Craftsmen: A Basic Manual on the Methods of Forming and Decorating Metals by Oppi Untracht
14. Crafts In Interior Architecture, 1990 onwards, Rishav Jain
15. Architecture for Kutch, Sanjay Udamale

16. The Book of Symbols: Reflections on Archetypal Images by Ami Ronnberg, ARAS, Zoe Francesca
17. Reading Architecture by Owen Hopkins
18. The Earthen Drum by Pupul Jayakar

w.e.f. Academic year _2018 and onwards

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NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAM

Bachelor of Design, Department of Design

Year II, Semester IV

L	T	P	C
		1.5	2

Course Code	**DTH 228**
Course Title	**Ergonomics II**

Course Learning Outcome (CLO):
At the end of the course the students will:

1. Articulate their project's design brief based on a clear understanding of human factors- interaction between product, associated needs, function, context and environment of use, capabilities and limitations of the object/device and semantics involved
2. Understand and base their design solutions on issues of cognitive Ergonomics and Human Factors

Syllabus: **Teaching hours**: **22.5 hours**

Unit 1: Cognitive psychology **Teaching hours**: **6 hours**

1.1 Principles of Human cognition in the real world
1.2 Memory, human behaviour and cognition

Unit 2: Principles of Cognitive Design **Teaching hours**: **6 hours**

2.1 Application of Cognitive ergonomics in design
2.2 Productivity and cognition

Unit 3: Cognitive task analysis **Teaching hours**: **10.5 hours**

3.1 Cognitive ergonomics and user experience in Product Design.
3.2 Introduction to task analysis tools and methods its relevance to industrial design

Suggested Reading

1. Measure of Man – By Henry Dreyfuss
2. Indian Anthropometric dimensions for Ergonomics Design Practice Deb Chakrabarty

w.e.f. Academic year _2018 and onwards

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NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAM

Bachelor of Design, Department of Design

Year II, Semester IV

L	T	P	C
2		9	8

Course Code	**DPR 226**
Course Title	**Design Project II: Simple Mechanical Device & Prototype Making**

Course Learning Outcomes (CLO):

Through this design project course, students will:

1. Understand the mechanics involved in a simple object or device to be improved upon
2. Design and produce a working prototype of the simple mechanical device/ appliance
3. Base their design solutions on user research, user experience and user- testing
4. Create solutions that are based on knowledge of materials and processes
5. Understand various qualitative and quantitative research methods specific to design projects

Syllabus: **Teaching hours**: **165 hours**

Unit 1: Basic concepts of research methods **Teaching hours**: **12 hours**

The course will look at the basic concepts of research methods and the tools that are generally used for quantitative and qualitative research methods

1.3 Survey and Questionnaire methods

1.4 Observation methods, stakeholder research, Ethnographic and user research

1.5 Market Research and opportunity mapping

Unit 2: Identification of Need **Teaching hours**: **30 hours**

Through application of the methods introduced in Unit 1, the students will;

2.3 Identify the needs of people in their daily life related to work and home environment where a mechanical device/ appliance is used.

2.4 Study in detail the above mentioned objects and products specific to functional and/ or other needs

2.5 Study User environments where such objects are in use.

Unit 3: User research, market research and opportunity Mapping

Teaching hours: **42 hours**

3.3 Stakeholder research, Ethnographic study

3.4 Identification of problems/ opportunities for redesign if any, in the products studied

3.5 Study of existing devices/ applications in the market; materials used technology of production of the products

Unit 4: Articulation of Brief, Design Ideations, Concept finalization

Teaching hours: **81 hours**

4.1 Redesign/ Improvement/ innovating on the product

4.2 Making of mock- up models

4.3 Making of 1.1 scale final prototype in actual materials

Suggested Readings:

1. The Design of Everyday Things by Don Norman
2. Designing Design by Kenya Hara
3. Universal principles of Design by William Lidwell, Kritina Holden and Jill Butler
4. Cradle to Cradle: Remaking the Way We Make Thingsby William McDonough and Michael Braungart

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAM

Bachelor of Design, Department of Design

Year II, Semester IV

L	T	P	C
			6

Course Code	**DFS 200**
Course Title	**Summer Internship- Apprenticeship II- 6 weeks**
Credits	**6**
Teaching hours:	**240 hours**

Course Learning Outcomes (CLO):

At the end of the Summer Internship-Apprenticeship of 6 weeks the students will:

1. Develop and enhance professional competencies
2. Have exposure to real life working environment
3. Understand the importance of industry work environment, market requirements, project deadlines, team-work and methodologies in practice, professional work ethics etc.

Syllabus: **Contact Hours: 240**

Unit 1: Apprenticeship in the chosen industry **Contact Hours: 200**

a. Application of design skills learnt in previous semesters
b. Development of practical knowledge related to specialization
c. Strengthening work values
d. Developing communication skills
e. Developing an understanding of market requirements, client briefs etc.
f. Understanding the work environment and design processes/methods used

Unit 2: Documentation of Experience **Contact Hours: 40**

Documentation of the summer internship – apprenticeship

2.1 Organization profile

2.2 Processes/methods observed, work portfolio, experience and knowledge gained

2.3 New skills developed and insights gathered

Suggested Reading

1. AIGA Professional Practice in Graphic Design, Tad Crawford
2. The Professional Practice of Design, Dorothy Goslett

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

w.e.f. Academic year _2018 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

Nirma University

Department of Design

Teaching & Examination Scheme of *(B.Des. Programme-Industrial Design)*

Semester V - A.Y. 2019-20 onwards

Sr. No.	Course Code	Course Title	Teaching Scheme (Total Hours)			Credits	Examination Scheme		
			L	P/S	T	C	Component Weightage		
							CE	P	SEE
1	IDSL 311	Psychology I (Cognition & Communication)	1	1.5		2	1.00		
2	IDSK 311	Materials & Processes III (Surface Finishes)	1	3		3	1.00		
3	IDSK 312	Creative Thinking Methods		4.5		3	1.00		
4	IDPR 311	Packaging Design		6		4	1.00		
5		Institute Elective I	1	7.5		6	1.00		
6	DSK 312U	University Elective	3			3	0.60		0.40
		Total	6	22.5		21			
* Field Courses									
7	DFS 200	**Summer Internship - Apprenticeship- 6 Weeks		240		6	1.00		
		Grand Total Credits				27			

L: *Lectures,* P/S: *Practicals-Studio,* T: *Tutorial,* C: *Credits*

CE: ***Continuous Evaluation + Semester End Jury (80 %+20%)***

LPW: *Laboratory / Project Work / Studio Work*									
**** Field Course: Students will work a minimum of 8 hours each day at whichever site they are***									
** Summer Apprenticeship: 1 Week = 40hours = 1 Credit									

	List of Department Elective Courses			
	Institute Elective I			
	IDPR 312E	**Furniture Design**		
	IDPR 313E	**UI-UX Design**		

NIRMA UNIVERSITY
INDUSTRIAL DESIGN PROGRAMME
Bachelor of Design, Department of Design
Year III, Semester V

L	T	P	C
1		1.5	2

Course Code	**IDSL 311**
Course Title	**Psychology I (Cognition & Communication)**

Course Learning Outcomes (CLO):

At the end of the course the students will:

1. Examine the basic methods of cognitive research and apply them in User research
2. Analyze human perception and responses to objects and object environments based on demographic and ethnographic factors
3. Understand human actions that are driven by cognitive functions and influenced by biological factors

Syllabus: Total Teaching hours: 37.5

Unit 1: Introduction to Cognitive Psychology **Teaching hours: 09**

1.1 Introduction to the functions of the human brain
1.2 Human Intelligence and Biological memory
1.3 Universal (archetypal) emotions and emotional responses shaped by our biology
1.4 Sense and Perception
1.5 The creative and the analytical mind

Unit 2: Cognitive Processing: Visceral, behavioral and reflective **Teaching hours: 09**

2.1 Perception and Communication shaped by demographic and ethnographic factors
2.2 Case Studies to demonstrate emotional responses to Objects and Object Environments in different cultural contexts
2.3 Empathy

Unit 3: User Research Teaching **hours: 19.5**

Study of Perception and Behavioral Impact on a selected group of persons with respect to:

3.1 Products
3.2 Public spaces
3.3 Image systems
3.4 Services
3.5 App based services

Suggested Readings:

1. *The Design of Everyday Things* by Don Norman, Publisher: Basic Books; 2nd Edition, 2013
2. *Lateral Thinking: A Textbook of Creativity* by Edward de Bono, Publisher: Penguin UK, 2016
3. *The Social Animal*, by Elliot Aronson, Publisher: Worth Publishers, 2011
4. *Sensation and Perception*, by Jon Harris, Publisher SAGE Publications Ltd., 2014
5. *Art of Thinking Clearly*, by Rolf Dobelli, Published by Hodder and Stoughton; 2013
6. *Thinking Fast and Slow*, by Daniel Kahneman, Published by Farrar, Straus and Giroux, 2011

NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAMME

Bachelor of Design, Department of Design

Year III, Semester V

L	T	P	C
1		3	3

Course Code	**IDSK 311**
Course Title	**Materials & Processes III (Surface Finishes)**

Course Learning Outcomes (CLO):

At the end of the course the student will

1. Develop different kinds of finishes on specified materials, within current environmental and other regulatory practices
2. Identify advanced finishes used to enhance physical and functional characteristics of materials
3. Understand and classify properties of various materials and the need to create finishes on them

Syllabus: **Teaching hours**: **60**

UNIT 1: Introduction to Materials and Finishes **Teaching hours**: **20**

1.1 Introduction of to different kinds of materials and their properties

1.2 Industrial and non-industrial processes for different materials and finishing techniques

1.3 Industry Visits

UNIT 2: Material Finishes **Teaching hours**: **20**

2.1 Types of surface quality finishes and enhancement available

2.2 Finishing of surfaces and finishing contours of products with various physical tools and

processes

2.3 Finishes and their attributes

2.4 Environmental and regulatory considerations

UNIT 3: Workshop Assignment **Teaching hours**: **20**

3.1 Select an attribute and function; develop design solutions
3.2 Make samples

Suggested Readings:

1. *Model Making: Materials & Methods* by David Neat, Publisher: The Crowood Press Ltd., 2008
2. *Plastics: Surface and Finish* by W. Simpson, Publisher: Royal Society of Chemistry, 1995
3. *The Surface Texture Bible: More Than 800 Color and Texture Samples for Every Surface,* Cat Martin, Publisher: Harry N. Abrams; Spl. edition, 2005

NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAMME

Bachelor of Design, Department of Design

Year III, Semester V

L	T	P	C
		4.5	3

Course Code	**IDSK 312**
Course Title	**Creative Thinking Methods**

Course Learning Outcomes (CLO):

At the end of the course the students will:

1. Design creative solutions for everyday problems with new insights developed through new ways of seeing in a non-linear and non-causative manner
2. Apply divergent ways of thinking to solve design problems
3. Explore and infer new methods of problem solving by studying other organisms

Syllabus: **Total Teaching hours**: **67.5**

Unit 1: Bio Mimicry **Teaching hours: 15**

Introduction to the natural processes in nature and its study:

1.1 Study of an organism and its design strategies for survival
1.2 Study of its habitat, body, limbs, food collecting and other survival strategies

Unit 2. Ideating with Metaphors **Teaching hours: 12**

2.1 Exploration of problems and their origin

2.2 Identification of existing solutions and radically turning them around through use of techniques such as imagining with related metaphors, puns and puns on metaphors

Unit 3: Spontaneous and Intuitive Design solutions **Teaching hours: 12**

3.1 Solution making using unconventional materials
3.2 Quick Prototyping; thinking on one's feet

Unit 4: Recycle and Re-Use **Teaching hours: 12**

4.1 Discarded Objects as biological and technical nutrients of the environment

Unit 5: Thinking "Inside the Box" **Teaching hours: 16.5**

5.1 Subtraction: Removal of a significant part of a design
5.2 Task Unification: bringing tasks together, unifying them within one component
5.3 Multiplication: Repeating a component for a differing impact
5.4 Division: Separating components and placing in a new location
5.5 Attribute Dependency: Two unrelated product attributes to be correlated with each other

Suggested Readings:

1. *Cradle to Cradle: Remaking the Way We Make Things*, by William McDonough, North Point Press, 2002
2. *Children Solve Problems* by Edward De Bono, Penguin Books, 1972
3. *The Ecology of Commerce: A Declaration of Sustainability*, Revised Edition, Collins Business Essentials, 2010
4. *The Humane Gardener: Nurturing a Backyard Habitat for Wildlife*, Nancy Lawson, Princeton Architectural Press, 2017

NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAMME

Bachelor of Design, Department of Design

Year III, Semester V

L	T	P	C
		6	4

Course Code	**IDPR 311**
Course Title	**Packaging Design**

Course Learning Outcomes (CLO):

At the end of the course the student will:

1. Develop packaging solutions for commodities and/or consumer goods
2. Build brand prominence of a company through packaging
3. Draft the technical grids and the requisite packaging structures
4. Develop ideational sketches and CAD renderings of packaging concepts based on the given brief
5. Demonstrate knowhow on various types of packaging materials, manufacturing processes and technologies involved and the statutory information required by law

Syllabus: **Teaching hours**: **90**

UNIT 1: Introduction to Packaging Design **Teaching hours**: **24**

1.1 Introduction to Packaging and types of packaging design
1.2 Samples and case-studies of good and innovative packaging designs
1.3 Study of different packaging materials and its properties, their application, tools and production methods in use
1.4 Exploration/recreation of an existing packaging solution
1.5 Industry visits

UNIT 2: New Packaging Design Solutions **Teaching hours: 30**

2.1 Articulation of a Design brief based on a hypothetical or real-life context
2.2 Brand research, market study and survey of the selected product category

2.3 Concept explorations of design ideas, renderings, mock-ups and computer modeling
2.4 Design development of proposed structural solutions and visual branding propositions

UNIT 3: Developing the Prototype of the Design Solution **Teaching hours: 36**

3.1 Layout and drafting of the packaging
3.2 Final prototype of the proposed Packaging Design
3.3 Development of a system of packaging for the category of product
3.4 Communication on the packaging and documentation

Suggested Readings:

1. *Packaging Design: Successful Product Branding from Concept to Shelf* by Marianne Klimchuk and Sandra A. Krasovec, Publisher: John Wiley & Sons Inc., 2013
2. *Structural Packaging: Design Your Own Boxes and 3-D Forms* by Paul Jackson, Publisher: Laurence King Publishing, 2012
3. *50 Trade Secrets of Great Design: Packaging by Stafford* Cliff, Rockport Publishers, 2002

NIRMA UNIVERSITY
INDUTRIAL DESIGN PROGRAMME
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Year III, Semester V

L	T	P	C
1		7.5	6

Course code	**IDPR 312E**
Course Title	**Furniture Design**

Course Learning Outcome (CLO):

At the end of the course students will:

1. Design new furniture and a working prototype based on a specific design brief
2. Construct and apply advanced joinery for assembly of the furniture
3. Develop design concepts of customized/universal furniture requirement
4. Demonstrate knowhow of mass manufacture and mass customization requirements of furniture

Syllabus: **Teaching hours: 105**

UNIT 1: Introduction to Furniture Design **Teaching hours**: **30**

1.1 History and types of furniture design
1.2 Contemporary and modern design requirements
1.3 Furniture materials, planar and moulded elements
1.4 Furniture construction and types of Joineries
1.5 Ergonomics study related to the specified furniture requirements
1.6 Available Furniture technology for manufacturing and surface finishes
1.7 Industry Visits

UNIT 2: Furniture Design **Teaching hours**: **75**

2.1 Development of Design Brief
2.2 Brand research, market study and user survey
2.3 Design of a Furniture object and system towards a specific function
2.4 Design development: Concepts and digital prototype
2.5 Construction & Technical drawing (scale- 1:5 or 1:10) of the design
2.6 Prototype in 1:1 or scale model in 1:5 or 1:10 of the selected concept
2.7 User testing and refinement
2.8 Documentation and Communication

Suggested Reading:

1. *Woodworkers Guide to Furniture Design*, by Garth Graves, Publisher: F+w Media Inc., 2002
2. *Furniture Design: An Introduction to Development, Materials and Manufacturing*, by Stuart Lawson, Publisher: Laurence King Publishing, 2013
3. *1000 chairs*; Book by Charlotte Fiell and Peter Fiell, Publisher: Taschen GmbH, Multilingual edition, 2017

NIRMA UNIVERSITY
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Year III, Semester V

L	T	P	C
1		7.5	6

Course Code	**IDPR 313E**
Course Title	**UI - UX Design**

Course Learning Outcomes (CLO):

At the end of the course the students will:

1. Design a smart product using the relevant electronic tool kit
2. Build an application to support the smart product using principles of User Experience Design. Information architecture and Usability Engineering
3. Apply the finer nuances of User Interface, User Interaction and User Experience design based on User research
4. Design skills to design graphic interface using appropriate software
5. Gain technical skills and knowhow of electronic components and programming of sensors

Syllabus: Teaching hours: 127.5

Unit 1: Introduction to UI- UX **Teaching hours: 30**

1.1 What is UI-UX Design
1.2 The necessity and function of UI-UX Design; programs and languages that drive the functions
1.3 User Interaction with products, applications and services
1.4 Role of a UI- UX Designer; case studies of various types of Information architecture and its connectivity to Supply chain

Unit 2: Understanding the backend of the Smart devices: **Teaching hours: 30**

2.1 Introduction to Arduino
2.2 Sensors: Functions and programming
2.3 Introduction to Adobe UX for Interface design
2.4 The working of the elements together

Unit 3: UI-UX Design Process: Initial Research **Teaching hours: 30**

3.1 Identification of a product category for intervention
3.2 Research on the Smart product domain
3.3 Understanding User Needs and Goals; Understanding cognitive processes
3.4 Study and analysis of relevant technology for application to the product
3.5 Insights and concept development of Product architecture using physical and digital components

Unit 4: UX/UI Minor Design Project **Teaching hours: 37.5**

4.1 Design Development
4.2 User Testing and Impact study
4.3 Refinement of solution

Suggested Readings:

7. *The Elements of User Experience: User-Centered Design for the Web* by Jesse James, Publishers: New Riders, 2010
8. *Observing the User Experience: A Practitioner's Guide to User Research* by Mike Kuniavsky, Andrea Moed, Publishers: Morgan Kaufmann, 2012
9. *Sketching User Experiences: Getting the Design Right and the Right Design Book* by Bill Buxton, Publishers: Focal Press, 2010
10. *Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests* (Paperback) by Jeffrey Rubin, Dana Chisnell, Publisher: Wiley, 2008
11. *Arduino Programming in 24 Hours, Sams Teach Yourself*, by Richard Blum, Publisher: Pearson Education, 2015

Nirma University

Department of Design

Teaching & Examination Scheme of *(B.Des. Programme-Industrial Design)*

Proposed Semester VI - A.Y. 2019-20 onwards

Sr. No.	Course Code	Course Title	Teaching Scheme (Total Hours)			Credits	Examination Scheme		
			L	P/S	T	C	Component Weightage		
							CE	P	SEE
1	IDTH 321	Introduction to Intellectual Property Rights	2	1.5		3	1.00		
2	IDSL 321	Psychology II (Cognition & Communication)	1	1.5		2	1.00		
3	IDSK 321	Materials & Processes IV (New Emerging Materials)	1	4.5		4	1.00		
4	IDSK 412	Portfolio Making (Analog and Digital)		6		4	1.00		
5	IDPR 321	Design Project: Technically Complex Device		12		8	1.00		
6		Institute Elective I		6		4	1.00		
		Total	4	31.5		25			

*** Field Courses**									
8	**IDFS 300**	****Summer Internship II**				**8**	**1.00**		
		Grand Total Credits				**25**			
L: *Lectures*, P/S: *Practicals-Studio*, T: *Tutorial*, C: *Credits*			**CE: *Continuous Evaluation + Semester End Jury (80 %+20%)***						
LPW: *Laboratory / Project Work / Studio Work*									
**** Field Course: Students will work a minimum of 8 hours each day at whichever site they are***									
** Summer Internship: 1 Week = 40 hours = 1 Credit									
** Summer Internship will be part of Semester VII's Teaching & Examination Scheme									

	List of Department Elective Courses	
	Institute Elective I	
	IDPR 322E	**Design of Exhibition & Display Structures**
	IDPR 323E	**Toy & Game Design**

NIRMA UNIVERSITY
INDUSTRIAL DESIGN PROGRAMME
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Year III, Semester VI

L	T	P	C
2		1.5	3

Course Code	**IDTH 321**
Course Title	**Introduction to Intellectual Property Rights**

Course Learning Outcomes (CLO):
At the end of the course the student will:

1. Develop an understanding of various types of Intellectual Property Rights applicable in India and globally
2. Identify the laws that are applicable to design
3. Demonstrate understanding of concept of copyright, patents, collective common open source etc

Syllabus: **Total Teaching hours**: **52.5**

The course will introduce the students to various types of Intellectual Property Rights in India and give a global perspective through lecture, presentations and group assignments.

Unit 1: Overview **Teaching hours**: **15**

1.1. Global and National perspective
1.2. Types of IPR and its applicability in commerce
1.3. IPR constituting inventions (patents), trademarks and geographical indications (GIR) of source etc.
1.4. Copyright and design rights which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs
1.5. Understand the philosophy of Open Source, Creative Commons and issues of ethics - plagiarism etc.

Unit 2: Patents and Trademarks **Teaching hours**: **13.5**

2.1 Patent and Trademarks
2.2 Copyrights
2.3 Design Act

Unit 3: Project Work **Teaching hours**: **24**

3.1 Group assignment and application of learning to assigned project

Suggested Readings:

1. *Law Relating to Intellectual Property (Fifth Edition)* by Wadehra B L, Publisher: Universal
2. Law Publishing Co. 2. *Intellectual Property Rights In India 2nd Edition* by V.K Ahuja, Publisher: LexisNexis.

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Year III, Semester VI

L	T	P	C
1		1.5	2

Course Code	**IDSL 321**
Course Title	**Psychology II (Cognition & Communication)**

Course Learning Outcomes (CLO):
At the end of the course the student will:

1. Critically assess key concepts in human behavior, perception and meta-cognition
2. Gain knowledge of applications of cognitive science for social communication
3. Demonstrate understanding of key theories and methodologies of contemporary interdisciplinary cognitive science, philosophy and design studies

Syllabus: **Teaching hours**: **37.5**

Unit 1: Cognitive science and communication theory **Teaching hours**: **9**

1.1. Affective science and the Cognitive Revolution
1.2. Decision theory, Choice theory and Embodied cognition
1.3. Models of communication in social psychology
1.4. Cognitive science and Artificial Intelligence

Unit 2: Introduction to theories of social cognition **Teaching hours: 9**

2.1. Integrated design thinking and meta-cognition
2.2. Human developmental psychology and the Nature v/s Nurture debate
2.3. Concepts of mental models and simulation
2.4. Communication theory and culture

Unit 3: Principles of sensory perception and consciousness **Teaching hours**: **9**

3.1. Cognitive Semiotics: Concepts of meaning, memory, perception, emotion, action
3.2. Parallel and lateral thinking
3.3. Theory of mind

Unit 4: Students will do field research and experiments **Teaching hours**: **10.5**

Suggested Readings:

1. *Emotional design*, Author: Norman, D, York, NY: Basic Books, 2004
2. *Designing for Humans*, Author: Noyes, J., London: Psychology Press, 2001
3. *Meaning, Mind and Communication*: *Explorations in Cognitive Semiotics*, Authors: Zlatev, J., Sonesson, G., Konderak, P., Berlin: Peter Lang GmbH, 2016
4. *Cognitive Psychology*: *Connecting Mind, Research, and Everyday Experience*, Goldstein, E., Publisher: Cengage, 2018

w.e.f. Academic year _2019 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

NIRMA UNIVERSITY
INDUSTRIAL DESIGN PROGRAMME
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Year III, Semester VI

L	T	P	C
1		4.5	4

Course Code	**IDSK 321**
Course Title	**Materials & Processes IV (New Emerging Materials)**

Course Learning Outcomes (CLO):
At the end of the course the students will:

1. Develop a prototype keeping in mind its user functionality, design aesthetics etc.
2. Analyze the multi-dimensional properties of the new emerging materials to determine a suggestive approach to design
3. Select new materials that can be used to develop divergent design opportunities

Syllabus: **Total Teaching hours: 82.5**

This module inculcates an understanding of materials that are unconventional and innovative in nature. Materials that have emerged in the market in response to factors like social hazards, scarcity of resources, innovation through smart technology are introduced here. A meticulous study of the multidimensional properties of the same is followed in order to create better design solutions.

Unit 1: Introduction to New Emerging Materials **Teaching hours: 34.5**

1.1 Introduction to a range of materials, beyond the mainstream materials that are available in the market. (E.g. Concrete fabric or Canvas, Carbon fibers, Hydrogel, Transparent wood composites, Protein based fiber etc.)

1.2 Industry Visits

i. Research & Development departments of Institutions such as CIPET etc.
ii. Interaction with Material scientists/experts

1.3 Identify materials and understand the following aspects:

i. Composition
ii. Functional, mechanical, endurance and performance properties
iii. Environmental impact and Costing

1.4 SWOT analysis of the properties of the researched materials

Unit 2. Ideating and Material explorations

Teaching hours: 24

2.1 Determine the properties of the material
2.2 Hands - on exploration with material to identify potential

Unit 3: Prototype Development **Teaching hours: 24**

3.1 Ideation through sketches, material explorations, user functionality
3.2 Demonstration and review
3.4 Final design prototype

Suggested Readings:

1. *Materials Innovation & Design :* by Dimitris Kottas, Links International, 2011
2. *Materials for Design* : by Chris Lefteri, Laurence King, 2014

w.e.f. Academic year _2019 and onwards
Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

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L	T	P	C
		12	8

Course Code	**IDPR 321**
Course Title	**Design Project: Technically Complex Device**

Course Learning Outcomes (CLO):

At the end of the course the student will:

1. Design a technically complex device
2. Develop a prototype of a working product
3. Create design concepts based on conventional needs and create unconventional and contextually new ideas
4. Develop understanding of user needs and functionality of products based on experiential and qualitative user research

Syllabus: **Total Teaching hours**: **180**

Unit 1: Identification of Opportunity Areas and Product Intervention:

Teaching hours: **12**

1.1 Study of conventional products, locating opportunities that are new responses to emerging context

1.2 Study of unconventional products whose function is cultural/symbolic: locating potential for redefinition of the product for new age User/Consumer

1.3 Study and locate a need through personal experiential situations or through Qualitative Users' survey to identify needs areas that have potential for defining new product Category

Unit 2: Study of Smart Technology in everyday products/devices/appliances:

Teaching hours: **12**

2.1 Understand Mechanisms involved

2.2 Understand Electronics (Sensors, Actuators, Frequencies) involved

Unit 3: Selection of Opportunity Area and articulation of Design brief:

Teaching hours: **24**

3.1 Articulation of need/aspiration (Unmet and unarticulated needs)

3.2 Defining attributes and functional requirements

3.3 User persona and profile

- Stakeholder analysis
- Final design brief

Unit 4: Concept Development of Smart Product: **Teaching hours**: **42**

4.1 Ideation and iterations based on User needs and functionality
4.2 Quick prototyping using appropriate materials and technology for concept
4.3 validation

Unit 5: Product finalization and Product detailing: **Teaching hours**: **30**

5.1 Product detailing
5.2 Product renders
5.3 Design Drawings

Unit 6: Prototyping:
Teaching hours: **60**

6.1 Scaled working prototype in actual/simulated materials
6.2 User product trials

Suggested Readings:

1. *Smart Products, Smarter Services: Strategies for Embedded Control*, Author: Mary J. Cronin, Publisher: Cambridge University Press, 2010
2. *Smarter Homes: How Technology Will Change Your Home Life (Design Thinking)*, Author: Alexandra Deschamps-Sonsino, Publisher: Apress, 2018
3. *Customer Centered Products: Creating Successful Products Through Smart Requirements Management*, Author: Ivy F. Hooks, Kristin A. Farry, Publisher: AMACOM, 2000
4. *Material Value: More Sustainable, Less Wasteful Manufacturing of Everything from Cell Phones to Cleaning Products*, Author: *Julia L F Goldstein*, Bebo Press, 2019

w.e.f. Academic year _2019 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

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INDUSTRIAL DESIGN PROGRAMME

Bachelor of Design, Department of Design

Year III, Semester VI

L	T	P	C
			8

Course Code	**IDFS 300**
Course Title	**Summer Internship II**

Course Learning Outcomes (CLO):

At the end of the Summer Internship Apprenticeship of 8 weeks, the student will be able to:

1. Develop and enhance professional competencies
2. Take part in real life work environment and understand the importance of industry work environment, market requirement, project deadlines, team work and methodologies in practice, professional work ethics etc.

Syllabus: Contact Hours: 320

Unit 1. Apprenticeship in the chosen industry

1.1 Application of design skills learnt in previous semesters
1.2 Development of practical knowledge related to specialization
1.3 Strengthening work related values
1.4 Developing communication skills
1.5 Developing an understanding of market requirements, client brief etc.
1.6 Understanding work environment and design processes/methods used

Unit 2. Documentation of experiences

Documentation of the summer internship-apprenticeship

2.1 Organization profile
2.2 Processes/Methods observed, work portfolio, experience and knowledge gained
2.3 New skills developed and insights gathered
2.4 Contribution to the company's project delivery.

Suggested Readings:

1. *Development of Life Skills and Professional Practice,* Author*:* Shalini Verma, Publisher: Vikas Publishing House, 2014
2. *The Professional Practice of Design,* Author: Dorothy Goslett, Publisher: B T Batsford Ltd, 1984

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Year III, Semester VI

L	T	P	C
		6	4

Course Code	**IDPR 322E**
Course Title	**Design of Exhibition and Display Structures**

Course Learning Outcomes (CLO):

At the end of the course the students will:

1. Design and create a structure to house an outdoor experience
2. Build structures or systems of exhibit structures and display stands required to promote and showcase scientific ideas, commercial merchandise and museum objects.
3. Utilize the principles involved for incorporating lighting and interactive technologies
4. Demonstrate understanding about materials, principles of space and its perception enhancing properties.

Syllabus: **Total Teaching hours: 90**

Unit 1: History of Display for Commerce and Culture: **Teaching hours: 12**

1.1 Study of bazaars, fairs, museums, world expositions
1.2. Understanding materials, merchandise, space and human interactions
1.3. Understanding purpose and function and resultant impact
1.4. Understanding temporality of short-term expositions

Unit 2: Understanding Structures: **Teaching hours: 24**

This will be hands-on and workshop-based learning. Students will explore by:

2.1 Assembling and dis-assembling small structural elements such as Umbrellas, Tents, Modular-DIY furniture pieces, stepladders, foldable collapsible tables, etc.

Unit 3: Study of one structural system of assembly: **Teaching hours: 24**

3.1 Selection of any one principle- Collapsibility, Modularity, Gnomonic Expansion etc.
3.2 Study of any of the above principles evident in objects/ structures/living organisms

3.3 Conceptual explorations based on the above study to build Structures such as Outdoor canopies, exhibit-display structures etc.

Unit 4: Modelling and Prototyping: Teaching hours: 30

4.1 Modelling of the concepts in scaled down models in select materials

4.2 Prototype in 1:1 scale

Suggested Readings:

1. *The Art of Museum Exhibitions: How Story and Imagination Create Aesthetic Experiences,* Author: Leslie Bedford, Publisher: Apple Books
2. *Walk and Watch III,* Author: Weng Danzhi, Publisher: Artpower Intl, 2015
3. *Grand Stand 6: Designing Stands for Trade Fairs and Events,* Authors: Ana Martins and Evan Jehl, Compiler: Sarah de Boer-Shultz, Frame Publishers, 2018
4. *Collapsible: The Genius of Space-Saving Design,* Author: Per Mollerup, Chronicle Books, 2001
5. *Modular Structures in Design and Architecture,* Author: Asterios Agkathidis , BIS Publishers, 2009
6. *Performative Geometries: Transforming Textile Techniques,* Author: Asterios Agkathidis, BIS Publishers, 2009

w.e.f. Academic year _2019 and onwards

Key: L= Lecture, T= Tutorial, P= Practical, C= Credit

NIRMA UNIVERSITY
INDUSTRIAL DESIGN PROGRAMME
Bachelor of Design, Department of Design
Year III, Semester VI

L	T	P	C
1		6	5

Course Code	**IDPR 323E**
Course Title	**Toy & Game Design**

Course Learning Outcomes (CLO):
At the end of the course the students will:

1. Create a game/toy and develop its prototype based on the understanding of user needs
2. Develop skills by working with a variety of materials and media to create the element of play/ creation/learning
3. Illustrate ideas through sketching and CAD make renderings of the concepts based on the given brief
4. Demonstrate understanding of creative concepts that inform the design of a Toy, Game and contemporary Gaming solution

Syllabus: **Total Teaching hours: 105**

The module is focused on Toys and Games that improve analytical thinking and gross motor skills. An introduction to the history and theory of play- leisure and learning, being important components of the same. This module concentrates on giving a conceptual understanding and an experience of games and gaming applicable for all age groups.

Unit 1: Introduction to Toy & Game Design **Teaching hours: 18**

1.1 Understanding the categories of Toy and Game Design
1.2 Traditional Toys, Digital Games, Educational Play and Futuristic Toys or Games

Unit 2: Psychology of Play **Teaching hours: 20**

2.1 Study of the psychology of play
2.2 Therapeutic aspects of Games

Unit 3: Design Development of a new Toy or Game **Teaching hours: 24**

3.1 User study, market study and ethnographic study
3.2 Design brief development and concept ideation through sketches, rendering, physical and digital mock-ups
3.3 Exploration using a variety of materials
3.4 Design review and testing

Unit 4: Final Prototype Development **Teaching hours: 43**

Suggested Readings:

1. *Homo Ludens: A Study of the Play Element*, Author: Johan Huizinga, Publisher: Angelico Press, 2016
2. *Board and Table Games from Many Civilizations*, Author: R. C. Bell, Dover Publications, 2000
3. *Man, Play and Games*, Author : Roger Caillois, University of illinois press,1958

w.e.f. Academic year _2019 and onwards

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Nirma University

Department of Design

Teaching & Examination Scheme of B.Des. Programme - Industrial Design

Proposed Semester VII - A.Y. 2020-21 onwards

Sr. No.	Course Code	Course Title	Teaching Scheme (Total Hours)			Credits	Examination Scheme Componenet Weightage		
			L	P/S	T	C	CE	P	SEE
1	IDTH 411	Systems Thinking	1	3		3	1.00		
2	IDSK 411	Advanced 3D Modelling		4.5		3	1.00		
3	IDSK 322	Elements of Form & Space III (Unconventional Materials)	1	4.5		4	1.00		
4		Institute Elective 1	2	9		8	1.00		
5		Institute Elective 2	1	3		3	1.00		
		Total	5	24		21			
* Field Courses									
6	DFS 300	Summer Industry Internship				8	1.00		
		Grand Total Credits				29			

L: *Lectures,* P/S: *Practicals-Studio,* T: *Tutorial,* C: *Credits, LPW: Laboratory / Project Work / Studio Work*

CE: Continuous Evaluation + Semester End Jury (80 %+20%)

* Field Course: Students will work a minimum of 8 hours each day at whichever site they are located

** Summer Apprenticeship: 1 Week = 40hours = 1 Credit; Summer Industry Internship of Sem VI is part of Semester VII's Teaching & Examination Scheme

List of Department Elective Courses			
INSTITUTE ELECTIVE 1		**INSTITUTE ELECTIVE 2**	
IDPR 411 E	**Design of Public Utility Systems**	**IDTH 413 E**	**Introduction to Artificial Intelligence**
IDPR 412 E	**Design of Institutional/Occupational Furniture**	**IDTH 415 E**	**Advanced Interaction Technologies**

NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAMME

Bachelor of Design, Department of Design

Year IV, Semester VII

L	T	P	C
1		2	3

Course Code	**IDTH411**
Course Title	**Systems Thinking**

Course Learning Outcomes (CLO):

At the end of the course the students will:

1. Understand systems thinking as a method of mapping complex ecosystems
2. Depict causal relationships between systems elements
3. Learn giga-mapping techniques to display complexity
4. Identify and sort design intervention opportunities for the system studied

Syllabus: **Total Teaching hours**: **60**

Unit 1: Understanding systems **Teaching hours: 15**

1.1 Series of lectures from different faculty members in a seminar mode, so that students develop a multi-perspective of system complexities
1.2 Understand the importance of systems thinking and how it is different from the conventional design process based approach
1.3 System archetypes
1.4 Sociological Points of View in systems
1.5 Roles and functions of system elements
1.6 Systemic failures or shortcomings of systems thinking
1.7 Wicked problems

Unit 2: Giga-mapping: (Assignment) **Teaching hours: 20**

2.1 Qualitative and quantitative research to establish points-of-view
2.2 Systems modeling frameworks

2.3 Information design for representation of relationships

Unit 3: Opportunity identification & causal loops: **Teaching hours: 25**

3.1 Causal loops and relationship mapping
3.2 Inflection points and impacts in the system
3.3 Understanding time as an influencer

Suggested Readings:

1 *Meadows, D. H., & Wright, D. (2015). Thinking in systems: a primer. White River Junction, VT: Chelsea Green Publishing.*
2 *The systems bible: the beginner's guide to systems large and small John Gall - General Systemantics Press - 2006*
3 *Design Issues*

w.e.f. Academic year _2019 and onwards

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NIRMA UNIVERSITY

INDUSTRIAL DESIGN PROGRAMME

Bachelor of Design, Department of Design

Year IV, Semester VII

L	T	P	C
		3	3

Course Code	**IDSK 411**
Course Title	**Advanced 3D modelling**

Course Learning Outcomes (CLO):

At the end of the course the students will:

1. Understand parametric modelling methods using the platform of Solidworks
2. Understand and demonstrate design for manufacturing considerations
3. Develop a competence to do exploded views of assemblies

Syllabus: **Total Teaching hours**: **67.5**

Unit 1: Basic modelling techniques **Teaching hours: 47.5**

1.1 Introduction of Solidworks Software and its basic tools and commands
1.2 Understand the 2D Orthography to 3D model and construction of 3D digital models
1.3 Explore tools and commands to understand the geometric of 3D and also explore the editing tools to make 3D models

Unit 2: Motion Modelling: **Teaching hours: 20**

3.1 Understand the basic tools of Assembly
3.2 Understand the relations between different parts and its calibration.
3.3 Introduction of Frames and Animation

3.4 Generation of product assembly visualizations

Suggested Readings:

1. *Engineering Drawing*, Bhatt, N. D., Charotar Publishing House, Anand, (2003)
2. *Solidworks 2018: A Power Guide for Beginners and Intermediate Users*., CADartifex, Createspace Independent Pub; 5 edition (1 February 2018)

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Nirma University
Department of Design
Teaching & Examination Scheme of B.Des. Programme-Industrial Design

Semester VIII - A.Y. 2020-21 onwards

Sr. No.	Course Code	Course Title	Teaching Scheme (Total Hours)			Credits	Examination Scheme Componenet Weightage		
			L	P/S	T	C	CE	P	SEE
1	CDGP	Major Research Project	6	30		26	1.00		
		Total	6	30					
* Field Courses									
		Grand Total Credits				26			

L: Lectures, P/S: Practicals-Studio, T: Tutorial, C: Credits, LPW: Laboratory / Project Work / Studio Work
CE: Continuous Evaluation + Semester End Jury (60 % + 40%)
Major Research Project: Students will work a minimum of 8 hours each day at whichever site they are located-Industry, Campus, Field etc.

List of Department Elective Courses			
Major Research Project 1		Major Research Project 2	
CDGP 421	Industry Sponsored Project	CDGP 422	Self-initaited Research/Innovation Project

NIRMA UNIVERSITY
INDUSTRIAL DESIGN PROGRAMME
Bachelor of Design, Department of Design
Year IV, Semester VIII

L	T	P	C
		30	18

Course Code	**IDDP 421**
Course Title	**Degree / Major Research Project**

Course Learning Outcomes (CLO):

At the end of the course, the student will be able to:

1. Apply design learning and demonstrate proof of design competencies through creation of appropriate design solutions towards the professional/self-initiated design brief.
2. Analyze contextual scenarios, users' and stakeholder's needs through the application of design research methods.
3. Demonstrate good conceptual skills in developing a sharper design brief, using opportunity-mapping abilities to understand context, customer, client and commercial requirements.
4. Create new design solutions, through prototyping, testing and evaluation of the design product/service, and further refinement, if necessary.

Syllabus **Total Time Duration: 18 Weeks**

UNIT I: Selection of Organization and Design Brief **Time Duration: 2 Weeks**

i. Project Articulation: Understanding the Company/Organization's requirements
ii. Project Brief: Articulating the requirements as stated by the company/self of goals/objectives, market and user segment profile, product-service to be created, expected outcomes
iii. Project Time line: Broad articulation of phases of the design process in synchronization with Company/self initiated project's design brief requirements
iv. Project Plan Articulation: Identification of partners, service providers, budgets, regulations

UNIT II: Secondary & Primary Research **Time Duration: 4 Weeks**

i. AEIOU Analysis: Activity, Environment, Interactions, Users and Objects
ii. Secondary Research: Research to be initiated related to the subject selected of similar design initiatives, competitor brands, media strategies, literature review
iii. Primary Research: Inquiry and Observation of Users/Consumers and the service / product, Contextual study

iv. Stakeholder Study: Understanding the requirements of each significant player in the service that could impact the design offering
v. Current/ existing Product survey and detailing
vi. 7C analysis: Cause, Context, Comprehension (Use only 3C in Unit 2)

UNIT III: Empathy and Ideation **Time Duration: 6 Weeks**

i. Empathy mapping, capturing what people do, say, think, and feel in the context of the problem
ii. Synthesize User Needs (Self-esteem, Psychological needs, Safety Needs, Belonging needs, self-actualized needs etc.)
iii. Creating Story Boarding: Happy Stories and Sad Stories
iv. Creating Customer Journey Map, Scenario Building, User Persona
v. Ideation: Creative Pause, Crowd storming, Brain Storming, visualization, provocation and sketching
vi. 7C Analysis: The Check (requirements) and Conception (Drafting Possibilities)

UNIT IV: Prototyping and User Feedback **Time Duration: 6 Weeks**

i. Development of a low fidelity model on paper, clay, thermocol or any other medium
ii. Material selection and Process selection for the Prototyping
iii. Mechanical / Electrical/ electronic Assembly as per requirement
iv. Programming, Validation and testing of mock up model
v. Development of a high-fidelity model using additive manufacturing, vacuum foaming, sheet metal bending, resin printing, turning / milling machine
vi. 7C Analysis: Crafting and Connections (User Feedback)

Degree Project Documentation

- Title, Abstract and Acknowledgement
- Table of Contents
- Introduction and Initial Degree Project Brief
- Profile of Industry/client and Design brief
- Research Phase: Secondary Research, Primary Research
- Empathy Process
- Ideation Process
- Prototyping, Proof of Concept, Manufacturing Process and Material Selection
- User Feedback and Final Design Brief
- The Design Process
- Learning and Reflection
- Certificate of Completion

Degree Project Jury & Presentation

- Jury/Viva to a team consisting of External Reviewer, Internal Faculty mentor and Industry mentor
- In the case of a self-initiated project, an internal senior faculty/HoD will take the place of the Industry mentor
- Presentation to the community

Three reviews will be held, one every 6 weeks. The same team comprising the External Reviewer, Internal Faculty mentor and Industry Mentor will review and evaluate the students.

Note: The above Units/stages (from 1 to 6) are not linear; many of them are simultaneous and may move laterally.

Suggested Readings:

1. *The Ultimate Guide to Internships: 100 Steps to Get a Great Internship and Thrive in it*, Eric Woodard, Publisher: Allworth 2015
2. *Research for Designers : A guide to methods and practice*, by Gjoko Muratovski, SAGE Publisher, 2015
3. *Doing research in Design*, by Christopher Crouch and Jane Pearce, Bloomsbury Publishers, 2013
4. *Design Research Methods and Perspectives*, by Brenda Laurel, Tit Press Publishers, 2003
5. *Design for Inclusivity*, by Roger Coleman and John Clarkson, Taylor & Francis Publishers, 2016
6. *Research Methodology*, C.R. Kothari, New Age Publishers Pvt. Ltd., 2018
7. *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*, Tim Brown with Barry Katz, Harper Collins e-books, 2009
8. *Design Thinking: Understanding How Designers Think and Work*, Nigel Cross, Bloomsbury Academic - An imprint of Bloomsbury Plc, 2011

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