

SPECIALIZATION PROGRAMS

BACHELORS OF DESIGN / BACHELORS OF VISUAL ARTS

PRODUCT DESIGN

REVISED SYLLABUS FOR 2019 ONWARDS

AS PER THE CBCS COURSE STRUCTURE

Revised Course Matrix & Syllabus applicable from 2019 onwards

BANGALORE CENTRAL UNIVERSITY

BVA / B.Des -PRODUCT DESIGN
Semester III

	Subject Code	Title of the Paper	Instruction Hrs/ week	Duration of Exam (hrs)	Marks			Credits
					IA	Exam	Total	
Part 1	University	Language I	3	3	30	70	100	2
	University	Language II	3	3	30	70	100	2
		CORE THEORY						
Part 1	PD31	History of Industrial Design	3	3	30	70	100	2
		CORE STUDIO COURSE						
Part 2	PD32	Design thinking (Practical)	6	-	30	70	100	2
	PD33	Models, Mockups and Prototypes (Practical)	5	-	30	70	100	2
	PD34	Manual and Digital Drafting (Practical)	4	-	15	35	50	1
	EL35.1/2/3	(Elective) 35.1 Digital Design-I 35.2 Graphics Design-I 35.3 Revitalization of Arts	4	-	15	35	50	1
	PD36	Basic Electronics and Electricals (Practical)	3	-	15	35	50	1
Part 3	University Code	Science and Societies	3	3	30	70	100	2
	CC & EC –	Workshop	-	-	15	35	50	1
		Total Marks & Credits					800	16

BVA / B.Des PRODUCT DESIGN
COURSE MATRIX - SEMESTER IV

	Subject Code	Title of the Paper	Instruction Hrs/week	Duration of Exam (hrs)	Marks			Credits
					IA	Exam	Total	
Part 1	University Code	Language I	3	3	30	70	100	2
	University Code	Language II	3	3	30	70	100	2
Part 2		CORE THEORY						
	PD41	Design research methodology (Theory)	3	3	30	70	100	2
		CORE STUDIO COURSE						
	PD42	Design Ideation (Practical)	8	-	30	70	100	2
	PD43	Materials and Manufacturing Processes (Practical)	5	-	30	70	100	2
	PD44	Basic Mechanical and Mechanisms (Practical)	3		15	35	50	1
	EL 45.1/2/3	(Elective) 45.1 Digital Design-II 45.2 Graphics Design-II 45.3 Digital Animation	4	-	15	35	50	1
	PD46	Advanced Product Drawing (Practical)	3		15	35	50	1
Part 3	CC & EC	Workshop - Industry Experience		-	15	35	50	1
	University Code	Non Core	2	3	30	70	100	2
		Total Marks & Credits					800	16

BVA / B.Des PRODUCT DESIGN
COURSE MATRIX - SEMESTER V

	Subject Code	Title of the Paper	Instruction Hrs/ week	Duration of Exam (hrs)	Marks			Credits
					IA	Exam	Total	
Part 2		CORE THEORY	-	-				
	PD51	Theory of Design I (Theory)	3	3	30	70	100	2
		CORE STUDIO COURSE						
	PD52	Design Ethnography(Practical)	8	-	75	175	250	5
	PD 53	Human Factors, Ergonomics and Interface (Practical)	6	-	60	140	200	4
	PD54	Digital Methods 1: (Practical)	3		30	70	100	2
	EL55.1 / 2 / 3	(Elective) 55.1 Digital Matte painting 55.2 Camera and Film editing 55.3 Photography	4	-	30	70	100	2
	PD56	Project work (Practical)	6	Report Evaluation	30	70	100	2
	CC and EC	Workshop - Industry Experience	-		15	35	50	1
Part 3	University Code	Banking and Finance	2		30	70	100	2
		Total Marks and Credits					1000	20

PRODUCT DESIGN
COURSE MATRIX - SEMESTER VI

	Subject Code	Title of the Paper	Instruction Hrs/week	Duration of Exam	Marks			Credits
					IA	Exam	Total	
		CORE THEORY	-	-				
	PD61	Modern Design Theory	3	3	30	70	100	2
		CORE STUDIO COURSE						
	PD62	Digital Skills and Fabrication (Practical)	8	-	75	175	250	5
	EL 63.1 63.2 63.3 63.4	(Departmental Elective) 63.1 Lighting design 63.2 Furniture design 63.3 Decorative Products 63.4 Packaging Design	4		60	140	200	4
	PD 64	Introduction to UI design (Practical)	5	--	30	70	100	2
Part 2	EL 65.1/2/3	(Elective) 1. Interaction Design 2. Motion Graphics 3. Digital Illustration Technique	3	--	30	70	100	2
	PD66	Digital Methods 2: (Practical)	3	-	30	70	100	2
Part 3	SDC	Entrepreneurship and Innovation	2	3	30	70	100	2
	CC/EC	Project – Industry Experience			50	--	50	1
		Total Marks and Credits					1000	20

BVA / B.Des PRODUCT DESIGN
COURSE MATRIX - SEMESTER VII

	Subject Code	Title of the Paper	Instruc tion Hrs/ week	Durati on of Exam (hrs)	Marks			Credits
			Theory		IA	Exam	Total	
Part 2		CORE THEORY	-	-				
	PD71	Design studio Management (Theory)	2	3	30	70	100	2
		CORE STUDIO COURSE						
	PD 72	Multidisciplinary design	10	-	150	350	500	10
	PD 73	Portfolio, Publication and Dynamic Media (Practical)	2	-	30	70	100	2
	EL 74.1 74.2 74.3	(Departmental Elective) 74.1 Sustainable design 74.2 Space and Environment design 74.3 Vehicle and transport design	4	--	60	140	200	4
	EL 75.1 75.2 75.3	(Elective) 75.1 Game Design 75.2 Videography 75.3 Preproduction	4	-	30	70	100	2
	PD 76	Design Thesis (Dissertation)	6	--	90	210	300	6
		Total Marks and Credits					1300	26

**SPECIALIZATION PROGRAM IN
PRODUCT DESIGN
COURSE MATRIX - SEMESTER VIII**

	Subject Code	Title of the paper	Instr uctio n Hrs/ week	Duratio n of Exam(h rs)	Marks			Credit
					IA	Exam	Total	
Part 2			Theo ry					
	PD81	Graduation Project (Practical)	16	--	210	490	800	16
	PD82	Internship	--	--	150	350	500	10
		Total Marks & Credits		-			1300	26

SEMESTER 3

Year 2 / SEMESTER3/ SPECIALIZATION SYLLABUS

Program: B.V.A Product Design

Course Title: Language I:

Course Code: University Code

Course Credit: 2 credit Hours

As prescribed by the University

Year 2 / SEMESTER3/ SPECIALIZATION SYLLABUS

Program: B.V.A Product Design

Course Title: Language II:

Course Code: University Code

Course Credit: 2 credit Hours

As prescribed by the University

Year 2 / SEMESTER3/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des -

Product Design

Course: History of Industrial Design

Course Code: PD 31

Course Credit: 2 Credit Hours

Brief description of the Course:

History is a powerful tool; a basic understanding of the history of design and familiarity with important design styles, movements and designers is essential for thorough design work. By examining the work of other designers, we are better able to identify our own interests and concerns. Using history to focus our own work is an effective method of avoiding unnecessary distractions, false starts, pitfalls, and mistakes. So much of the practice of Industrial Design is based on research, investigation, and interpretation. To duplicate these efforts instead of building on them is, at best, a wasted opportunity. Beyond these practical concerns, though, history can inspire. Finding objects, designers, and solutions that have resonance for us allows us a richer experience as designers, and lets us tailor the broad field of Industrial Design to our own interests, and stay focused on what matters to us. Knowing how designers have solved problems in the past can inform today's problem solving, leading to stronger, richer, and faster solutions. Focusing our eyes and brains on designs that inspire us guarantees that our own work contains excitement and passion.

Learning Objectives:

- a) This class will offer a chronological overview of history of Industrial Design, presented in a lecture format.

- b) Topics discussed will include major design styles and movements, significant designers, manufacturers, and design-related companies, innovations in technology and material use, and the development of sales, marketing, user-focused designing, and the history of design process.
- c) Students will explore different definitions of Industrial Design and identify historical, contemporary, and future boundaries of the profession.
- d) One objective of the class is to produce basic comprehension of the history of Industrial Design. The larger objective, though, is to afford you access to the widest possible range of information and images, to allow personal exploration and deeper knowledge where you choose. This will help you bring history to life in a way that is useful to you in studio practice and beyond.

Pedagogy: Lectures, Group discussions, in-class student presentations, assignments.

Course Outline:

- Defining the landscape: How do you define Industrial Design?
- We will look at centuries of innovation that predate our profession, and the smarts in evidence will astound you. What did the world of craft-based, make-what-you-need production, royal patronage/guild systems, and agricultural economy look like?
- Innovations in different parts of the world. Highlights of arts and crafts movements
- Bauhaus and the New Academic thinking
- Post-War confidence in design, business, and lifestyle help fuel corporate growth.

Textbooks:

- i. *History of Modern Design: Graphics and Products Since the Industrial Revolution* By David Raizman
- ii. *Design History: A Student's Handbook* by Hazel Conway, Routledge,
- iii. *Design The Indian Context* By H Kumar Vyas
- iv. “*Design the International Movement with Indian Parallel*”. by Prof. H Kumar Vyas

Year 2 / SEMESTER3/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Design thinking

Course Code: PD 32

Course Credit: 2 Credit Hours

Brief description of the Course:

Of six core Design courses throughout the Course, this is the first introductory course. Here students will learn the design process, research methodology. This course provides scope for students to understand introductory level experience of problem solving techniques, skills through practical assignments in prototyping and testing. Here students will try to understand how Design will act and in what form and material. In this course Students will learn to work in Groups and individual in studio environment. Students will also be taught the Perspectives and Object drawing, Light and shadow, Renderings, Live sketching of various object, Exercises in studio lighting etc.

Learning Objectives:

- (a) After completing this course students will be able to understand the Design process and Design Methodology.
- (b) Students will be able to understand the simple problem solving techniques.
- (c) Students will be able to demonstrate the skills of Practical prototyping and Testing.
- (d) Students will be able to work individual and in groups.

- (e) Perspectives and Object drawing, live sketching of object and their parts
- (f) Light and shadow
- (g) Renderings, Exercises in studio lighting

Pedagogy: Presentations, Case study, Discussions and Practical assignment

Course Outline:

- Introduction to Design Thinking – Resources, Methods
- Meaning and objectives of research
- Introduction to Fundamentals of the design research and process.
- To go through case studies and Examples to understand the Design process, Chronological studies for analysis of designed objects/systems/environments and their eclectic evolution through technology change.
- Simple exercises in design creation/recreation through mock ups/montages/paste boards using primary materials such as paper, board, wood etc.

Textbooks:

- i. *Product Design: Fundamentals and Methods* by Roozenburg and Eekels
- ii. *Universal Principles of Design* by William Lidwell, Kritina Holden, Jill Butler Publisher: Rockport Publishers, 2003
- iii. D. Norman, *Design of Everyday Things*, Currency Books, New York, 1990.
A. *Forty, Objects of Desire*, Thames & Hudson, 1998
- iv. M. Droste, *Bauhaus*, Taschen, 1994.
- v. Joycelyn de Noblet Ed., *Industrial Design – Reflections of a Century*, Thames and Hudson, 1991
- vi. *How to draw* by Scott Robertson
- vii. *Sketching : The Basics* by Koos Eissen and Roselien Steur

Year 2 / SEMESTER3/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Models, Mockups and Prototypes

Course Code: PD 33

Course Credit: 2 Credit Hours

Brief description of the Course:

In this Course student gets hands on experience in working design workshop, where they will engage in learning to build basic 3D real models out of materials of different nature. Here students will learn to use different tools and the safe use power devices. Course introduces the methods of making scale models, planning and execution through trial and error documentation. Course also introduces to rapid prototyping techniques and modalities required for outsourced fabrication. This Course requires, workshop and materials and tools.

Learning Objectives:

- a) In this Course students will be able to demonstrate considerable knowledge in working workshop, proper using of tools and safety measures
- b) Students will be able to understand the materials and their proper usage in 3D Modeling.
- c) Students will be able to understand hands-on full-scale and scaled making, choosing an

appropriate modeling method for the intended purpose.

- d) Students will be able to know the rapid prototyping and testing

Pedagogy: Instruction led Practical Presentations, Demonstrations and assignments

Course Outline:

- Introduction to Hand and Power tools and learning around appropriate and safe use of tools/machines in construction classrooms
- To understand the characteristic qualities and usability of Materials in Model making.
- To learn to do simple and basic 3D Models using different Materials Like clay, Plaster, Wood / wooden sheets/ Metal sheets.
- To integrate with Product Design studio for the 3D scale Modeling of the product design undertaken
- To work on Scale model and Prototypes of the product Design finalized in Design Studio

Textbooks:

- i. *Professional Modelmaking: A Handbook of Techniques and Materials for Architects and Designers* by Norman Trudeau
- ii. *Prototyping and Modelmaking for Product Design - Bjarki Hallgri*

Year 2 / SEMESTER3/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Manual and Digital Drafting

Course Code: PD 34

Course Credit: 1 Credit Hours

Brief description of the Course:

This course introduces the principles and the basics of manual technical drawing skills and digital autocad drafting to the students. It introduces the basic geometry, projection techniques, and also to interpret the drawings. Course covers, basic Geometric lessons in construction of the basic shapes compass constructions of the geometric forms and figures, to use angles and tangents. Introduces orthographic projections and conventions, use of sections, auxiliary views and developments for basic 3D forms such as Prism, Cone and Cylinders. It also deals with the AutoCAD drafting which helps creates a basic 2D drawing of the product similar to technical drawing. Even at this fundamental level, the AutoCAD software is one of the most sophisticated computer applications that you are likely to encounter. This course covers the essential core topics for working with the AutoCAD software. This knowledge of Computer based Visualization helps students in sketching, testing, rendering and design control drawing (DCD). Deliverables include process drawings as well as DCD's with dimensioned technical specifications, sections, details and note.

Learning Objectives:

- a) In this course students will be able to understand the basic Geometry and the principles
- b) Students will be able to demonstrate considerable skills in different types of projections used
- c) Students will be able to effectively use the knowledge in 3D Modeling
- d) After completing this Course students will be able to understand and define the fundamentals of CAD and the application of Tools.
- e) Students will be able to demonstrate good amount of knowledge in drawing, testing and Rendering

- f) Students will be able to interpret the Technical specifications, sections, notes etc.
- g) Create fully dimensioned sectional and assembly technical drawings of a product component
- h) Create an exploded product view with parts and materials listing.

Pedagogy: Demonstrations, instructor led assignments and computer based demonstrations.

Course Outline:

- To introduce the basic geometry and the guiding principles
- To study Line styles and types such as; visible/ hidden/center/ cutting/ plane/ section/phantom
- To introduce different types of projections such as Multiple views and projections
- Orthographic projection /Auxiliary projection /Isometric projection /Oblique projection
- To study Perspective /Section Views /Scale /Showing dimensions /Sizes of drawings
- Understanding the AutoCAD work space and user interface using basic drawing, editing, and viewing tools; organizing drawing objects on layers; inserting reusable symbols (blocks), preparing a layout to be plotted; adding text, hatching, and dimensions
- Using more advanced editing and construction techniques
- Producing basic shapes and forms
- Producing basic curved and radiuses forms
- 3D modeling and texture surfacing

Textbooks:

- i. *Computer Aided Design and Manufacturing* By M.M.M. SARCAR, K. MALLIKARJUNA RAO, K. LALIT NARAYAN
- ii. *Fundamentals of Computer Aided Geometric Design* by Josef Hoschek, Dieter Lasser Peters, 1993
- iii. *Handbook of Computer Aided Geometric Design* edited by Gerald E. Farin, Josef Hoschek, Myung- Soo Kim
- iv. *Geometry of Design: Studies in Proportion and Composition* by Kimberly Elam, Publisher: Princeton Architectural Press, 2001
- v. *Sacred Geometry: Philosophy and Practice (Art and Imagination)* by Robert Lawlor, Publisher: Thames & Hudson, 1989.

Year 2 / SEMESTER3/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Core Elective

Course Code: EL 35

Course Credit: 1 Credit Hours

Brief description of the Course:

Aim of this course is to introduce both conventional and digital knowledge which enable students with multiple skill sets. Under this course number of subjects of different nature, scope and relevancy are provided to the students. These topics are of different complexity and technicalities. Students shall discuss with their guides/mentors and choose the elective based on their interest and requirement to the future application.

Year 2 / SEMESTER3/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Basic Electronics and Electricals

Course Code: PD 36

Course Credit: 1 Credit Hours

Brief description of the Course:

This course introduces the basics of electronic and electrical engineering, which is used in design. They will be taught to identify the electronic and electrical components and circuits, familiarise with electronic instruments like Digital Multimeter, DC regulated power supply, CRO etc. They will also be introduced with the soldering techniques, microprocessors, microchip, Arduino and Raspberry pie chips, LED display and programming etc. They will also be taught of how to do connect basic circuits and debug any problems in the circuits.

Learning Objectives:

- Students will learn different electrical components like resistors, capacitors etc
- They will learn how to use digital electronic instruments
- They will learn basics on power supply and different parameters affecting it
- They will learn different microprocessors, how to program them etc.
- They will also learn on Arduino and Raspberry pie chips and how to use them practically for many applications
- They will also learn on how to debug the electronics circuits
- How to use Multimeter

Pedagogy: Demonstrations, instructor led assignments and computer based demonstrations.

Course Outline:

- **Electronic components:** Different electronic components like capacitors, resistors, inductors etc usage will be taught.
- **Electrical circuits and power:** Basics on power supply and different parameters affecting it and few electrical instruments
- **Microprocessors:** taught on different microprocessors, how to program them for certain applications including LED strip etc.
- **Electronic chips:** Arduino and Raspberry pie chips and how to use them practically
- **Debug electronic circuits:** how to debug electronic products or circuits

Textbooks:

- i. Fundamentals of Basic Electricals and Electronics by BL Theraja S Chand
- ii. Basic Electronics by D.P Kothari
- iii. Electronic devices by Thomas L Floyd
- iv. Electronic devices and circuit theory by Nashelskey Boylestad

Year 2 / SEMESTER3/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Science and Societies

Course Code: University Code

Course Credit: 2 Credit Hours

Brief description of the Course: As prescribed by the University

Year 2 / SEMESTER3/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: CC & EC - Workshop

Brief description of the Course: Suitable Workshop / Activity / Project will be conducted in this semester

1. Simple Project :

Here Students will work in small groups and learn how to approach to the simple problems in the system. This project help them to apply the skills learnt in the previous and the present semesters and find out their importance.

2. Visual Journal writing:

Visual Journal is continuation of the earlier two semesters. However, here they use this space more as a diary of a design student for consolidating their ideas through scribbling, photograph and writing.

SEMESTER 4

Year 2 / SEMESTER4/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Language I

Course Code: University Code

Course Credit: 2 credit Hours

As prescribed by the University

Year 2 / SEMESTER4/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Language II

Course Code: University Code

Course Credit: 2 credit Hours

As prescribed by the University

Year 2 / SEMESTER4/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Design research methodology

Course Code: PD 41

Course Credit: 2 Credit Hours

Brief description of the Course:

In this course Students are introduced to design as a means to communicate ideas to multiple audiences through application of product semantics—distinguishing between self-perception and how others read design artifacts. There will be discussions on the design process and the problem solving methods. Case studies which help understanding different scenarios in which the approach to problem solving differs from each other.

Learning Objectives:

- a) After completing this course students will be able to demonstrate considerable ability in doing Product design research
- b) Students will be able to understand the varied complexity in the design problems.
- c) Students will be able arrive or derive a suitable solution
- d) Students will be able to display their Design thinking skills

Pedagogy: Lecture and presentations/Students seminars

Course Outline:

- Introduction to Design process and Design research Methodology
- To discuss to design as a means to communicate ideas to multiple audiences through application of product semantics - distinguishing between self-perception and how others read design artifacts.
- To identify where and how design can act.

- IDENTIFYING AND DEFINING THE PROBLEM
- ANALYSING INFORMATION - This involves listing questions regarding the project. Questions will vary from project to project. Questions need to be documented in relation to such issues as: TIME, COST, SAFETY, MATERIALS, PROCESSES, FUNCTION, APPEARANCE, ERGONOMICS
- SYNTHESIS – To discuss what Synthesis is and to follow the Analysis for providing answers to the questions. For example, questions on the choice of materials, or the way ergonomics is applied, must be answered after research is undertaken in such areas.
- EVALUATING AND SELECTING APPROPRIATE SOLUTIONS - The evaluation of an appropriate solution through the information collected and presented during research. Documenting the appropriate solution includes the development of detailed graphical information that will allow the construction or manufacture of the project.
- IMPLEMENTING CHOICES and EVALUATION

Textbooks:

- Design Research: Methods and Perspectives* edited by Brenda Laurel
- DRM, a Design Research methodology* by Lucienne T.M Blessing, Amaresh Chakrabarti

Year 2 / SEMESTER4/ SPECIALIZATION SYLLABUS

Program: B.V.A // B.Des Product Design

Course Title: Design Ideation

Course Code: PD 42

Course Credit: 2 Credit Hours

Brief description of the Course:

This is a continuation of the previous semesters Design Studio. It depends on the prerequisite from the previous semester Representational skill both hand and computer. There is continuous exploration of the design ideas for product design and improvisation of the ideas from the previous class. There will be a greater amount of interaction with the people for feedbacks.

Learning Objectives:

- Students will be able to display their further enhanced presentation skills
- Students will be able to explore and develop new ideas for design with feedbacks from the audience
- Students will be able to expand their research ability and develop skills to address the problems

Pedagogy: Instructions lead Lecture – Demonstrations and assignments

Course Outline:

- Product ideas - Imagination, People needs, Identification and analysis of samples of good and bad design for sensitization to Design quality/processes.
- The Product Brief – Defining the needs, Market trends

- To go through case studies and Examples to understand the Design process, Chronological studies for analysis of designed objects/systems/environments and their eclectic evolution through technology change.
- Simple exercises in design creation/recreation through mock ups/montages/paste boards using primary materials such as paper, board, wood etc.

Textbooks:

- i. *Product design: fundamentals and methods* by N. F. M. Roozenburg, J. Eekels
- ii. *The Fundamentals of Product Design* By Richard Morris

Year 2 / SEMESTER4/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Materials and Manufacturing Processes

Course Code: PD 43

Course Credit: 2 Credit Hours

Brief description of the Course:

This course briefs about the basic information required about the materials and processes commonly used by product designers and manufacturers at various scales of production. This course informs the core studio sequence by providing a foundation for understanding how a product works and how it can be made better, safer, and more sustainably. As a seminar, assignments will be both individual and team based, and will include a number of on-site field trips.

Learning Objectives:

- (a) Knowledge and understanding of structure and properties of different industrial materials
- (b) Evaluation and testing of the quality of engineering materials.
- (c) Knowledge and understanding of the most important manufacturing processes.
- (d) Understanding the relationships among material properties and manufacturing process parameters.

Pedagogy: Lecture, Presentations, discussions and Practical experiments and Industry visits

Course Outline:

- Introduction: General information, objectives,
- What is manufacturing? Product attributes, interfaces with other courses.
- Material properties: Nature of materials, stress-strain relationships, hardness, fluid properties, visco-elastic behavior of polymers.
- Engineering materials: Metal alloys, ferrous and non-ferrous materials, polymer technology, thermoplastics, thermo sets, elastomers, ceramics, composite materials.
- Processes for shapeless materials: Casting fundamentals and processes, casting quality, design aspects, powder metallurgy, rapid prototyping technologies.
- Shaping of polymers, rubber and composites: Polymer melts, extrusion, injection moulding, compression moulding, blow moulding, thermoforming, design aspects, processes for rubber and composites.

- Metal forming: Material behavior in metal forming, influence of temperature, friction and lubrication, rolling processes, forging processes, extrusion, wire and bar drawing.
- Joining and assembly: Fundamentals of welding, welding processes, weld quality, weldability, brazing, soldering, adhesive bonding, mechanical assembly, design aspects.
- Manufacturing (support) systems: Numerical control, industrial robots, group technology, FMS, production lines, quality control, metrology, measuring instruments, surface measurement.
- Summary: Overall overview, guidelines and recommendations, material and manufacturing process selection, last consultancy.

Textbooks:

- i. *Alessi: The Design Factory (Academy Editions)*
by Alessandro Mendini, Nonie Niesewand
- ii. *DeGarmo's Materials and Processes in Manufacturing - By E. Paul DeGarmo, J. T. Black, Ronald A. Kohser*
- iii. *Industrial Design*
by Raymond Loewy
- iv. *Industrial Design: Materials and Manufacturing Guide By Jim Lesko*

Video reference:

Manufacturing of golf balls, series 'How it's made', Source: Discovery/Teleac, about 5 minutes
Manufacturing of safes, series 'How it's made', Source: Discovery/Teleac, about 5 minutes

Year 2 / SEMESTER4/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Basic Mechanical and Mechanisms

Course Code: PD 44

Course Credit: 1 credit Hours

Brief description of the Course:

This course mainly deals with identifying different tools and machines, how to use them and safety measures. Material study and how to use them for joining and welding processes. Recognize various metal joining processes and power transmission elements. Understand the properties of common engineering materials and their applications in engineering industry. Discuss the working of conventional machine tools, machining processes, tools and accessories. Describe the advanced manufacturing systems.

Learning Objectives:

- Identifying different tools and machines, how to use them and safety measures
- Material study and how to use them for joining and welding processes
- Recognize various metal joining processes and power transmission elements.
- Understand the properties of common engineering materials and their applications in engineering industry.
- Discuss the working of conventional machine tools, machining processes, tools and accessories.
- Describe the advanced manufacturing systems.

Pedagogy: Classroom based learning, Workshop based learning.

Course Outline:

- **Properties, Composition and Industrial Applications of engineering materials:** Metals - Ferrous: cast iron, tool steels and stainless steels and non-ferrous such as aluminum, brass, bronze.

Polymers - Thermoplastics and thermosetting polymers. Ceramics - Glass, optical fiber glass, cermets. Composites - Fiber reinforced composites, Metal Matrix Composites Smart materials - Piezoelectric materials, shape memory alloys, semiconductors and insulators.

- **Joining Processes: Soldering, Brazing and Welding:** Definitions. Classification and methods of soldering, brazing and welding. Brief description of arc welding, oxy-acetylene welding, TIG welding, and MIG welding.
- **Belt drives:** Open & crossed belt drives, Definitions -slip, creep, velocity ratio, derivations for length of belt in open and crossed belt drive, ratio of tension in flat belt drives, advantages and disadvantages of V belts and timing belts, simple numerical problems.
- **Gear drives:** Types- spherical, bevel, worm and rack and pinion. Velocity ratio, advantages and disadvantages over belt drives, simple numerical problems on velocity ratio.
- **Lathe:** Principle of working of a center lathe. Parts of a lathe. Operations on lathe - Turning, Facing, Knurling, Thread Cutting, Drilling, Taper turning by Tailstock offset method and Compound slide swiveling method, Specification of Lathe.
- **Milling Machine:** Principle of milling, types of milling machines. Working of horizontal and vertical milling machines. Milling processes - plane milling, end milling, slot milling, angular milling, form milling, straddle milling, and gang milling.
- **Computer Numerical Control (CNC):** Introduction, components of CNC, open loop and closed loop systems, advantages of CNC, CNC Machining centers and Turning centers.
- **Robots:** Robot anatomy, joints and links, common robot configurations. Applications of Robots in material handling, processing and assembly and inspection.

Textbook:

- Elements of Mechanical Engineering, K. R. Gopala krishna, Subhas Publications, Bangalore, 2008.*
- Elements of Mechanical Engineering, Vol.-1 & 2, Hajra Choudhury, Media Promoters, New Delhi, 2001.*
- A Text Book of Elements of Mechanical Engineering", S. Trymbaka Murthy, 3rd revised edition 2006, I.K. International Publishing House Pvt. Ltd., New Delhi .*
- CAD/CAM/CIM, Dr. P Radhakrishnan, 3rd edition, New Age International Publishers, New Delhi.*
- Introduction to Robotics: Mechanics And Control, Craig, J. J., 2nd Ed. Addison-Wesley Publishing Company, Reading, MA, 1989.*
- Introduction to Engineering Materials", B.K. Agrawal, Tata McGrawHill Publication, New Delhi.*

Year 2 / SEMESTER4/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: CORE ELECTIVE

Course Code: EL 45.1/2/3/

Course Credit: 1 credit Hours

Course Description:

A common list of Electives is provided to all the programs of Art and Design. These elective courses focus on the interdisciplinary Subjects and digital skills. Based on the need of the program and interest among the individual students these electives are added. Every Student has to contact their mentor to choose the Electives with the help of Faculty Guide. These electives are partially taught in the class room, and the rest of the classes are focused by the student research and practice.

Year 2 / SEMESTER4/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Advanced Product Drawing

Course Code: PD 46

Course Credit: 1 credit Hours

Brief description of the Course:

Course will show you how to digitally sketch and draw skilled images that will stand up as professional work. The techniques taught in this course can be translated into any program from Photoshop to Procreate. This course will enhance or give you skills in digital drawing, or your money back. This course is your track to building a solid portfolio of digital art and concept art! Whether for your own portfolio. This course will take you from having little knowledge in how to draw and sketch to creating professional drawings using digital medium like Wacom. This also talks about the fundamentals of light, shadow and reflectivity; the focus is firmly on helping to improve visual understanding of the world around and on techniques for representing that world. Rendering is the next step after drawing to communicate ideas more clearly. This shares everything about how to render light, shadow and reflective surfaces. This book is divided into two major sections: the first explains the physics of light and shadow. One will learn how to construct proper shadows in perspective and how to apply the correct values to those surfaces. The second section focuses on the physics of reflectivity and how to render a wide range of materials utilizing this knowledge.

Learning Objectives:

- (a) Main objective of the course is to understand product sketching/ Drawing manually as well as digitally.
- (b) Is to understand the association of manual and digital product sketching/ drawing.
- (c) Is to use technology like Wacom to achieve professional results.
- (d) Is to learn the implementation of product sketching/ drawing in their design projects.
- (e) Is to improve their portfolio by using knowledge from this course.

Pedagogy: Computer based Demonstrations and explanation

Course Outline:

- **Sketching:** leaning objective here is to learn product sketching in detail
- **Manual Rendering:** Manual rendering with Alcohol marker, pestles and Acrylic.
- **Digital Sketching:** Finally transforming the same in digital medium.

Textbook:

- i. How to Render by Scott Robertson
- ii. Sketching by koos eissen, rosellen steur

Year 2 / SEMESTER4/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: CC and EC Workshop - Industry Experience

The word itself says that “Industry experience” students will have the experience of industry, what it is, what kind of machineries they use in there industry, what kind of atmosphere, what kind of projects they do, etc. all these important for product design students, to have this experience students must have to visit industries and factories outdoor class.

Observations:

Here students will visit small scale industries,

- a). how it runs
- b). man power.
- c). space and atmosphere
- d). how big machines and cost
- e). what kind of projects
- f). what is capital investments

Documentation:

Images, videos, discussions, notes.

In-class presentation and discussion

SEMESTER 5

Year 3 / SEMESTER5/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Theory of Design I

Course Code: PD51

Course Credit: 2 credit Hours

Brief description of the Course:

Course will examine, analyze, study, and discuss how design can be understood, described, and developed as a process of inquiry, thought, and action. Course will critically explore how to become a more skilled and successful designer and what it takes to develop both design inquiry, design thinking, and design action.

Course will allow students to experimenting with the design process, by studying and analyzing design behavior, by reflecting on design experiences, and by conducting intellectual discussions.. The overall purpose of the course is to support each student to establish a personal, reflective, and examined intellectual position in relation to design as a process of inquiry, thought, and action.

Learning Objectives:

- (a) After completing this Course students will be able to understand the background of the Design Theory, Study, Analysis, Synthesis and action.
- (b) Students will be able to experiment with Design process, by analyzing the design behavior
- (c) Students will be able to establish personal, reflective, and intellectual position in relation to Design as a process of Inquiry, thought and Action

Pedagogy: Lecture, Presentation, Discussions and seminars

Course Outline:

- Introduction to different theories of Design : Gestalt Theory /Maslow Hierarchy / Altman / Sommer / Hall / Kinzel
- Maslow's Hierarchy
- Ergonomics and Human Factors Engineering
- Design as a tradition (design, art, and science)
- Theory of Things
- Design Research and Design Practice
- Environmental Psychology - Areas of Research in Environmental Psychology – Personal space / Crowded space – Design and other Social factors
- Design and Cultural factors

Textbooks:

- i. *Buchanan, R. (1992). Wicked Problems in Design Thinking. In Design Issues, Vol. 8, No. 2. (Spring, 1992), pp. 5-21.*
- ii. *Cross, N. (2001). Designerly Ways of Knowing: Design Discipline versus Design Science.*
- iii. *Cross, Nigel. Design Thinking: Understanding How Designers Think and Work. Oxford/New York: Berg, 2011, 3-30.*
- iv. *Julier, Guy. The Culture of Design. London: Sage Publications, 2000, 1-64.*

Year 3 / SEMESTER5/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Design Ethnography

Course Code: PD 52

Course Credit: 5 credit Hours

Brief description of the Course:

This Course explore the opportunities for designers to utilize digital fabrication technologies that leverage the possibilities of the technology in order to deliver stakeholder benefits. The course has a heavy emphasis on material exploration and exercises knowledge learned in Materials and Manufacturing Processes, Computer-Aided Industrial Design, and design thinking and design ideation: Research, Design & Development. Students will be working both individually and collaboratively toward comprehending the difference between fundamental innovation and incremental change in their work as well as beginning to articulate the relationship of manufacturing/fabrication processes to larger societal contexts. This course develop design ideas, and to evaluate computing systems. *Doing Design Ethnography* is about one particularly influential approach: ethno methodologically informed or inspired ethnography. This approach focuses distinctively on the embodied work practices that people use to conduct their everyday activities and to concert them with others. It enables system developers to factor the social organization of human activities into IT research and systems design, and to do so with respect to its real world, real time character.

Learning Objectives:

- After completing this course students will be confident in understanding the application of the integrated knowledge of Digital Fabrication Technology.
- Students will be able to understand and apply the knowledge learnt from Materials and Manufacturing Process.
- Students will be able to comfortably use the knowledge learnt from the studio 1 and 2 Research, Design & Development
- Students will be able to work independently or in groups and capable of articulating relationship of manufacturing/fabrication processes to larger societal contexts.
- After completing this course students will be able to; Develop design ideas, evaluate computing system
- Analyze everyday activity of people and conduct comparative evaluation
- To conduct research based on the findings in system design

Pedagogy: Design Studio, Case studies, Research, Presentations and Project
Lecture, discussion lecture, discussions, field research

Course Outline:

- Product ideas - Imagination, To explore People needs
- The Product Brief – Defining the needs, Market trends
- To identify the problems of the selected objects/systems/environments. Analysis of samples of good and bad design for sensitization to Design quality/processes.
- Moderate exercises in design creation/recreation through mock ups/montages/paste boards using primary materials such as paper, board, wood etc.
- Course introduces various methods for generating useful research insight for design. Explores further in the key tools and methods needed to undertake interview and observation based

fieldwork, and introduces the challenges of;

- Understanding what client or company needs to know
- Turning field data The Course will allow to explore the design lifecycle and the latest methods for design innovation through hands-on projects. Into actionable insights and information.

Textbooks:

- Product Design and Development* by Karl T. Ulrich and Steven D. Eppinger McGraw-Hill 1995, 2000, 2004
- Product Design: A Practical Guide to Systematic Methods of New Product Development* by Mike Baxter
- The Art of Innovation - Lessons in Creativity from IDEO, America's Leading Design Firm* by Tom Kelley
- Designing and Conducting Ethnographic Research by Margaret Diane LeCompte Rowman Altamira, 1999
- Initiating Ethnographic Research by Stephen L. Schensul, Jean

Year 3 / SEMESTER5/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Human Factors, Ergonomics and Interface

Course Code: PD 53

Course Credit: 4 credit Hours

Brief description of the Course:

Aims to introduce basic understanding of design principles related to physical and cognitive ergonomics, as well as ethnography. This course provides the experience with user research and testing needed to enter Product Design Studio 4: Design Concepts and Applications. A seminar based course, a portion of the assignments will be done hands-on through modeling, rigging, and constructing testing props and mechanisms.

Learning Objectives:

- After completing this Course Students will be able to understand the basics of Ergonomics and related design Principle
- Students will be capable of understanding the needs of the design based on their research in Human factors
- Students will be capable of understanding the Anthropometrical, Psychological, Psycho- Social Consideration in Ergonomics.

Pedagogy: Research Presentations, Case studies, Discussions, Hands on experiments.

Course Outline:

- Definition of Ergonomics / Human Factors.
- Human capabilities and limitations in terms of engineering.
- Anthropometrical, Physiological, Psycho-social considerations in Ergonomics.
- Behavior, information processing and perception; Ergonomics design methodology;

- Occupational safety and stress at workplace; Workstation design; Furniture and Environment factors affecting
- Human performance; Design development and usability evaluation.
- Theory input follows relevant demonstrations and assignments.

Textbooks:

- i. *Design for Success: A Human-Centered Approach to Designing Successful Products and Systems* by William B. Rouse Publisher: Wiley-Interscience; 1 edition (January 8, 1991)
- ii. *The Right Fit: The Power of Ergonomics As a Competitive Strategy* by Clifford M. Gross Publisher: Productivity Press Inc, 1996

Year 3 / SEMESTER5/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Digital Methods 1

Course Code: PD54

Course Credit: 2 credit Hours

Brief description of the Course

This course enables the creation of 3D parts from 2D sketches, sheetmetal, composites, molded, forged or tooling parts up to the definition of mechanical assemblies. This course provides advanced technologies for mechanical surfacing & BIW. It provides tools to complete product definition, including functional tolerances as well as kinematics definition. CATIA provides a wide range of applications for tooling design, for both generic tooling and mold & die. It offers a solution to shape design, styling, surfacing workflow and visualization to create, modify and validate complex innovative shapes from industrial design to Class-A surfacing with the ICEM surfacing technologies. It supports multiple stages of product design whether started from scratch or from 2D sketches (blueprints).

Learning Objectives:

- (a) Students after completing this course will be able to create, modify, and present conceptual designs using 3D software
- (b) Students will be able to build 3dimensional models and presentation visuals for their project
- (c) Students will be able to create mechanical assembly models.
- (d) Learn how to render the models and they also learn how to give proper mechanical action to a particular part or applying kinematics to the product and look how it works in real life.

Pedagogy: Computer based demonstration and presentations; Practical Assignments

Course Outline:

- Elements of conceptual design
- Massing shapes with 3D solids;
- Integrating Raster images with solid models;
- Presenting the conceptual design; visual styles;
- Exporting and distributing conceptual designs

Textbooks:

- i. *Beginner's Guide to SOLIDWORKS 2018 - Level I* by Alejandro Reyes
- ii. *Mastering SolidWorks* by Matt Lombard

- iii. *Solidworks Simulation 2018: A Power Guide for Beginners and Intermediate Users* by ADArtifex, John Willis, and Sandeep Dogra
- iv. *CATIA Core Tools: Computer Aided Three-Dimensional Interactive Application* by Michel Michaud
- v. *Catia V5-6r2015 for Designers* by Prof Sham Tickoo Purdue Univ

Year 3 / SEMESTER 5/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Core Elective

Course Code: EL 55.1 /2/3

Course Credit: 2 Credit Hours

Brief description of the Course:

Aim of this course is to introduce both conventional and digital knowledge which enable students with multiple skill sets. Under this course number of subjects of different nature, scope and relevancy are provided to the students. These topics are of different complexity and technicalities. Students shall discuss with their guides/ mentors and choose the elective based on their interest and requirement to the future application.

Year 3 / SEMESTER5/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Project work –

Course Code: PD56

Course Credit: 2 credit Hours

This Course is focused on independent research Project based on the Knowledge acquired from the previous Product Design studios. In this course students will do field research, Market survey, Interaction with public and identify the research area, Product and the relevant production Industry. This is an integrated project of research to Design, Mock ups, Prototyping and Testing and final Presentation. Students will be guided by the subject expert/ mentor / external expert throughout the project until the submission. Final output from the Project will be reviewed by the External jury.

References: http://ocw.mit.edu/courses/sloan-school-of-management/15-783j-product-design-and-development-spring-2006/lecture-notes/clas1_int_crse_6.pdf

Year 3 / SEMESTER 5/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: CC and EC -Workshop – Industry Experience Credits 1 Credit Hrs

Field trips and store visits give students practical learning experience away from their regular classroom activities. Industry visits are a very important component of the learning process. It gives the students an experience in seeing the process that initiates at the design table, then goes prototyping and testing, thereafter tooling, manufacturing and assembly. Regular trips to different industries are organized for students so that they not only learn but also get practical and experiential exposure about the management industry. The students not only get a chance to experience a visual tour of these industries but also learn the ways and techniques in which people work over there. The career aspirants also get management advice from the directors and others in-charge of each industry that helps in motivating them to be efficient enough to achieve their career goals.

Observations

- a). man power.
- b). space and atmosphere area
- c). how big machines and cost and maintains
- d). what kind of projects and requirements
- e). what is capital investments and challenges
- f). turnover

Documentation: Images, videos, discussions, notes, In-class presentation and discussion

Year 3 / SEMESTER 5/ SPECIALIZATION SYLLABUS

Program: B.V.A Product Design

Course Title: Banking and Finance

Course Code: University Code

Course Credit: 2 Credit Hours

Brief description of the Course: As prescribed by the University

SEMESTER 6

SEMESTER 6/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Modern Design theory

Course Code: PD61

Course Credit: 2 credit Hours

Course Description:

Modern Design Theory is a research and discussion platform with a focus on issues that are affecting design today and in the future like Artificial Intelligence, Sustainability, New-manufacturing technologies etc. AI is being used today to enable collaborative robotics, automated workflows based on predictive analytics, improving recruitment and retention of manufacturing experts, and optimizing equipment and plant effectiveness. Automotive designs, rapid prototype printing and aerospace and defense parts printing will be the largest manufacturing segments. Fastest growing segments of this technology today include dental printing, medical implant and device printing, and product creation and prototype printing.

Learning Objectives:

On completion of the subject students will be able to

- Understand the problems of Advancement of technology on design
- They even learn on the contemporary and the future technologies with their advantages and disadvantages.
- Students will also learn on how to use these technology and get updated for the future designs

Pedagogy: Lecture, discussions, seminar and presentations

Course Outline:

- With the advancement in the Artificial intelligence, the computer can design for manufacturability rather than creative products
- **Sustainability:** Designing physical objects, the built environment, and services to comply with the principles of ecological sustainability.
- **3D Printing:** By 2020, 75% of manufacturing operations worldwide could use 3D-printed tools, jigs, and fixtures for the production of finished goods. Automotive designs, rapid prototype printing and aerospace and defense parts printing will be the largest manufacturing segments. Fastest growing segments of this technology today include dental printing, medical implant and device printing, and product creation and prototype printing.
- **Advanced Robotics:** The fastest growing market segments for Advanced Robotics include consumer, health care, and retail. Robotics is increasingly being adopted in aerospace manufacturing to increase product quality, yield rates, reduce operating costs and improve time-to-customer production performance.
- **Digital design, simulation, and integration (DDSI):** The fastest growing segments of this market include design automation, plant design, product design & testing, and drafting & 3D modeling. Automakers switching from 2D to 3D CAD have realized 20% reduction in design time.
- **Advanced Materials:** Advanced materials include a wide spectrum of chemicals and materials like lightweight, high-strength metals and high-performance alloys, advanced ceramics and composites, critical materials, bio-based polymers, and nanomaterials. Advanced Materials are also essential for producing automotive catalytic converters to filter toxic pollutants
- **Robust innovation ecosystems:** The Global Manufacturing Competitiveness Index (GMCI) study

found that nations who invest in exponential manufacturing technologies and innovation ecosystems would emerge more competitive than those who choose to compete on price alone. Higher value, advanced products, and processes that require excellent product quality and deliver greater margins are driving faster, permanent innovation.

Textbooks:

- i. Braha D. and Maimon O. 1998. *A Mathematical Theory of Design: Foundations, Algorithms, and Applications*. Springer.
- ii. Design for a Contemporary World: A Textbook on Fundamental Principles By Christian Boucharenc
- iii. Design of Future Things by Don Norman
- iv. Design Futures by Bradley Quinn
- v. Operating manual for spaceship by B.Fuller

Year 3 / SEMESTER6/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Digital Skills and Fabrication

Course Code: PD 62

Course Credit: 5 credit Hours

Brief description of the Course:

Students will be exploring the research options and put their actions in to a complex user research and applying, Testing in the design out comes. This transitional studio bridges learning in Human Factors, Ergonomics, and Interface with previous studies around form giving and production. Students will be given the opportunity to work with outside partners or advisors and will demonstrate ability to work both individually as well as on a team. While project work will be primarily studio based, content may require off- site research and engagement.

Learning Objectives:

- (a) In this Course students will be will be able to apply their research in more Coherent areas of Design such as User Design interface.
- (b) Students will be able to understand and apply the Human factors, Ergonomics in their design development
- (c) Students will be able to display independence and confidence in exploring the options to work with external resource people.

Pedagogy: Lecture, Discussions, Presentations, Field oriented Practical research

Course Outline:

- Complex User research and application of the outcome in design development
- To discuss and applying the Human factors and ergonomics in Design development
- To explore the opportunity to work with outside partners suitable to the design research in this level

Textbooks:

- i. *Human Work Interaction Design: Usability in Social, Cultural and Organizational Contexts...* edited by Dinesh Katre, Rikke Orngreen, Pradeep Yammiyavar, Torkil Clemmensen

- ii. *DESIGN CONCERNS: VOLUME 1 - collection of some well-researched and well-presented Colloquium Papers*
- iii. *INDIAN ANTHROPOMETRIC DIMENSIONS FOR ERGONOMIC DESIGN PRACTICE*
By *Debkumar Chakrabarti*
- iv. *Design for Success: A Human-Centered Approach to Designing Successful Products and Systems* by *William B. Rouse* Publisher: *Wiley-Interscience*;
- v. *The Right Fit: The Power of Ergonomics As a Competitive Strategy* by *Clifford M. Gross*
Publisher: *Productivity Press Inc, 1996*

Year 3 / SEMESTER6/ SPECIALIZATION SYLLABUS

Program: B.V.A Product Design

Course Title: DEPARTMENTAL ELECTIVE

Course Code: EL63.1 /2 /3/4

Course Credit: 3 credit Hours

Course Description:

This is a departmental elective course which gives students an opportunity to learn some extra skills other than their main Domain. The course aims towards perusing their interest in a specific domain of product design. This course have four options as listed

- Lighting design
- Furniture design
- Decorative products
- Packaging Design

The course will cover basic level of understanding of the subject. Further the course will introduce literature around the subject, understanding of the subject with respect to other design domain and the research methods for the subject.

Year 3 / SEMESTER6/ SPECIALIZATION SYLLABUS

Program: B.V.A Product Design

Course Title: Introduction to – UI/UX

Course Code: PD 64

Course Credit: 2 credit Hours

Course Description:

User Interface refers to the design of the interface between the user and the product on the other hand User Experience refers to the user's overall experience of using the product. Here the students are required to go through the fundamentals of UX/UI which includes the introduction to literature around the subject, Basic UX research methods, information architecture and lean UX.

Learning Objectives:

The students will be able to go through the fundamentals of UX/UI which includes the introduction to literature around the subject, Basic UX research methods, information architecture and lean UX.

Pedagogy: Lecture, Discussion, Presentation, Field research

Course Outline:

Students are required to go through the fundamentals of UX/UI which includes the introduction to literature around the subject, Basic UX research methods, information architecture and lean UX.

- Introduction to UX/UI: Introduction to the History, present and future of UX.
- Introduction to UX research methods: A quick hands on practice of UX research methods.
- Introduction to information architecture and its importance: Understanding Information and architecting it is very important to create a good experience in UX.
- Introduction to Lean UX: An introduction to lean UX will help students to understand the working process and the environment of UX.
- Making report: Students are required to create a report

Textbooks:

1. Design for everyday things by Don Norman
2. Don't make me think, Steve Krug

Year 3 / Semester 6
Course Title: Core Elective

Course Code: EL 65.1 /2/3

Course Credit: 2 Credit Hours

Brief description of the Course:

Aim of this course is to introduce both conventional and digital knowledge which enable students with multiple skill sets. Under this course number of subjects of different nature, scope and relevancy are provided to the students. These topics are of different complexity and technicalities. Students shall discuss with their guides/ mentors and choose the elective based on their interest and requirement to the future application.

Year 3 / SEMESTER6/ SPECIALIZATION SYLLABUS

Program: B.V.A Product Design

Course Title: Digital Methods 2

Course Code: PD 66

Course Credit: 2 credit Hours

Course Description:

NURBS modeling 3D software, used to conceptualize, design and fabricate products, in Various Industries from Architecture to Jewelry, We teach you how to design your own 3D models, and prototypes with the NURBS-modeling tools in Rhino. Understanding curve, surface, and solid to create objects, edit their geometry with full control, render also develop design data for fabrication. It can then be used with other applications to further enhance a project. For example, students can create a model and export the file to a CNC machine for prototyping or manufacturing or they can render the model and use it on web pages, newsletters, and presentations. The student can render, illustrate, and animate the model. In addition, models can be exported to most other design, rendering, and animation software applications.

Learning Objectives:

- (a) After completing this Course students will be able to create 3D models of the project and execute methods to modify them as and when required.
- (b) Students will be capable of creating their project presentation with this knowledge of 3D.

Pedagogy: Demonstrations and computer based practical work assignments.

Course Outline:

- Introduction with Interface, Navigation, commands, viewport etc. Line and curves, background line, curve modification, transform line to curve and freeform surface
- Ways to construct solid model, Offset, blend, extrude, trim, extract 2D from 3D models, rendering
- Customize into different layers, line types, line weight etc accurate drawings, advanced selections and shortcuts
- Advance tool for drawing 3D geometry, accurate and sectional perspective, bend, twist, find or create duplicate etc.

Textbooks:

- i. Inside Rhinoceros 3 by Ron K.C. Cheng
- ii. Grasshopper: Visual Scripting for Rhinoceros 3D by David Bachman
- iii. 3D Car Modeling with Rhinoceros

3 / SEMESTER6/ SPECIALIZATION SYLLABUS

Program: B.V.A Product Design

Course Title: Entrepreneurship and Innovation

Course Code: University Code

Course Credit: 2 credit Hours

Course Description: As per the University Syllabus

3 / SEMESTER6/ SPECIALIZATION SYLLABUS

Program: B.V.A Product Design

A

Course Title CC/EC : Industry Experience

Course Code: PD 6.6

Course Credit: 6 credit Hours

Course Description:

Field trips and store visits give students practical learning experience away from their regular classroom activities. Industry visits are a very important component of the learning process. It gives the students an experience in seeing the process that initiates at the design table, then goes prototyping and testing, thereafter tooling, manufacturing and assembly. Regular trips to different industries are organized for students so that they not only learn but also get practical and experiential exposure about the management industry. The students not only get a chance to experience a visual tour of these industries but also learn the ways and techniques in which people work over there. The career aspirants also get management advice from the directors and others in-charge of each industry that helps in motivating them to be efficient enough to achieve their career goals.

Observations:

- Man power.
- Space and atmosphere area
- How big machines and cost and maintains
- What kind of projects and requirements
- What is capital investments and challenges
- Turnover

Pedagogy: Images, videos, discussions, notes, In-class presentation and discussion

SEMESTER 7

4 / SEMESTER 7/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Design Studio Management

Course Code: PD 71

Course Credit: 2 credit Hours

Brief description of the Course:

This program will build business acumen and set the stage to build a viable business that is driven by design. Sustainable best practices are integrated throughout the program ensuring that how to make decisions that considers the environmental and social impacts along with economic success. Case studies of some of the successful Design projects are discussed.

Learning Objectives:

- (a) Students will be able to understand and explain the different process involved in Design Business.
- (b) Students will be able to understand the best business practices by the Design studio by studying the case studies.
- (c) Students will be able to apply the knowledge in their own projects

Pedagogy: Lecture, Presentations, Discussions and Seminars

Course Outline:

- Introduction to fundamentals Design Business Management - Introduction the Design Studios and work environment in India and abroad
- Design and Marketing – Differentiation through Design
- Design and Innovation – Coordination and exploration
- Design and Strategy: Transformation through Design
- Design Management in Practice
- Design Firm
- Operational Design Practices and Management
- Functional Design Management: Managing the Design Department
- Project Collaborations – National and International scenario – Challenges in Public Sector innovations

Textbooks:

- i. *Design Management: Using Design to Build Brand Value and Corporate Innovation*
By Brigitte Borja de Mozota
- ii. *Public Innovation Through Collaboration and Design* edited by Christopher Ansell, Jacob Torfing
- iii. *Strategic Management of Innovation and Design* By Pascal Le Masson, Benoît Weil, Armand Hatchuel

SEMESTER7/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Product Design Studio 5/ Multidisciplinary design

Course Code: PD72

Course Credit: 10 credit

Hours

Course Description:

This course will encourage students to take up multidisciplinary group projects with a high degree of project closure and advanced presentation. Students will get more clarity in their prior Learned subjects and employing design process in iterative, active, and analytical ways utilizing prototyping, testing, and comparative research. Projects work with outside partners and completed proof of concept(s) models are critiqued both inside and outside the university.

Course Objective:

- a) In this Course students will be will be able to apply their research in more Coherent areas of Design such as User Design interface.
- b) Students will be able to understand and apply the Human factors, Ergonomics in their design development
- c) Students will be able to display independence and confidence in exploring the options to work with external resource people.

Pedagogy: Lecture, Discussions, Presentations, Field oriented Practical research

Course Outline:

- Complex User research and application of the outcome in design development
- To discuss and applying the Human factors and ergonomics in Design development
- To explore the opportunity to work with outside partners suitable to the design research in this level

Textbooks:

- i. *Human Work Interaction Design: Usability in Social, Cultural and Organizational Contexts...* edited by Dinesh Katre, Rikke Orngreen, Pradeep Yammiyavar, Torkil Clemmensen
- ii. *DESIGN CONCERNS: VOLUME 1 - collection of some well-researched and well-presented Colloquium Papers*
- iii. *INDIAN ANTHROPOMETRIC DIMENSIONS FOR ERGONOMIC DESIGN PRACTICE* By Debkumar Chakrabarti
- iv. *Design for Success: A Human-Centered Approach to Designing Successful Products and Systems* by William B. Rouse Publisher: Wiley-Interscience;
- v. *The Right Fit: The Power of Ergonomics As a Competitive Strategy* by Clifford M. Gross Publisher: Productivity Press Inc, 1996

Year 4 / SEMESTER 7/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Portfolio, Publication and Dynamic Media

Course Code: PD 73

Course Credit: 2 credit Hours

Course Description:

This Course helps students in identifying different methods for documenting and communicating design ideas and achievements to different audiences. This course helps students frame and present work for potential internships as well as entry into design competitions, and introduces general strategies for creating promotional materials. Media will be both digital and print and will explore static presentation such as portfolio and active social media such as through blogging, twitter, etc.

SEMESTER7/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Departmental Elective

Course Code: PD74.1/2/3

Course Credit: 4 credit Hours

Course Description:

This is a departmental elective course which gives students an opportunity to learn some extra skills other than their main Domain. The course aims towards perusing their interest in a specific domain of product design. This course have three options as listed

- Sustainable design
- Space and Environment design
- Vehicle and transport design

The course will cover basic level of understanding of the subject. Further the course will introduce literature around the subject, understanding of the subject with respect to other design domain and the research methods for the subject.

Value added Course

Year 4 / SEMESTER - 7 / SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Core Elective

Course Code: EL 75.1 / 75.2 / 75.3

Course Credit: 2 credit Hours

Course Description:

A common list of Electives is provided to all the programs of Art and Design. These elective courses focus on the interdisciplinary Subjects and digital skills. Based on the need of the program and interest among the individual students these electives are added. Every Student has to contact their mentor to choose the Electives with the help of Faculty Guide. These electives are partially taught in the class room, and the rest of the classes are focused by the student research and practice.

SEMESTER7/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Design Thesis (Dissertation)

Course Code: PD76

Course Credit: 6 credit Hours

Brief Description of the Course:

Thesis should reflect on the knowledge gained from all the courses undertaken by the student in all the previous semesters. And the dissertation topic will be chosen with a specific outcome requirement.

Learning Objectives:

Design Thesis, as a dissertation will:

- Be able comprehend the design philosophy, theories, data collection and analysis and application in a chosen area of study.
- Guide students in Report making methodologies and presentation of collected data in a systematic manner for clear understanding.

Pedagogy: Research Methodology, Case Studies and Survey's,

Course Outline:

- Each student is expected to prepare a design thesis based on the topic chosen under an approved guide or mentor.
- Thesis should reflect the knowledge gained from all the courses undertaken by the student in all the previous semesters.
- The particulars of the schedule, content, presentation, format etc. is to be decided by the department from time to time and will be strictly followed.
- At the end of the semester each student is expected to submit all original drawings prepared as per the department specifications. Three copies of the report/dissertation in the specified format should be submitted to the department after the approval of the respective guides.
- The department will schedule the viva voce at its convenience only after the receipt of the thesis by the student. The performance sheet submitted by the guide and thesis committee should be the basis for allowing the student to appear for the final viva voce.
- The end exam is to be conducted by a jury comprising of an external examiner. One internal examiner and head of the department or his nominee.
- Plagiarism check will be undertaken before the internal submissions.

SEMESTER 8

SEMESTER8/ SPECIALIZATION SYLLABUS

Program: B.V.A/ B.Des Product Design

Course Title: Graduation Project:

Course Code: PD81

Course Credit: 16 credit Hours

Course Description:

Graduation project is the most important course in the degree, where in students are supposed to go through and implement everything they have learned in their degree program. Knowledge of all the subjects such as core theory, core practical and electives, is expected to be reflected in the final output and dissertation of the course.

Learning objectives:

Understanding of the complete process of doing a design project through learning the implementation of research methods in a professional environment.

Pedagogy: Lecture, Discussion, Presentation, Field research, Portfolio presentation and dissertation.

Course outline: Students are required to submit their graduation project dissertation along with the final outcome of the project. Students are required to follow step by step process discussed below

- **Project brief:** Students are expected to create one brief for their graduation project.
- **Empathize (Design research methods):** Students are required to go through extensive research in order to understand the users and the scope of the project.
- **Define (Analysis of the research outcomes):** After gathering the data from user research analysis is required in order to identify the problem.
- **Ideate (Generating concepts):** once the problem is being identified, students should start generating concepts for design solution. Final project outcome freezes here.
- **Prototype (Creating solutions):** Students here are required to decide appropriate material and process for making their prototype. Prototype must reach to the stage where the design should communicate with the user as intended.
- **Testing:** Students are required to go through a usability testing of the product with real users and come up with scope for improvement if required.
- **Evaluation of the testing:** This stage, students must go through the testing outcomes carefully in order to understand the experience of the user with the product.
- **Rework if required:** Students are required to rework on the project if required.
- **Compilation of the project for portfolio:** Students are required to create a presentation of their project
- **Making dissertation:** Dissertation has to be submitted for evaluating the student.

Textbooks:

- i. Design for everyday things by Don Norman
- ii. Research for Product Designers by Alex Miltron and Paul Rodrers
- iii. Product design and development by K Ulrich

SEMESTER7/ SPECIALIZATION SYLLABUS

Program: B.V.A / B.Des Product Design

Course Title: Internship / In house Project

Course Code: PD 82

Course Credit: 10 credit Hours

Course Description:

Objective of providing an internship to the students is to provide them exposure to the outside world on which their confidence builds. In this Course students will be working on a live project in a Design Studio environment / an Organization similar to that with hands on experience in Research and Product development.

OR

Student will be put under the guidance of an external resource person from the Industry/ Research / Similar Organization.