Course Structure

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CR: Credit, CH: Contact Hours

Semester I

Course code	Course Title	L	T	P	S	CR	CH
DDBD101	Design History	0	0	0	3	3	6
DDBD102	Elements of Design	0	0	0	3	3	6
DDBD103	Representation Techniques	0	0	0	3	3	6
DDBD104	Indian Art, Craft and Design	0	0	0	3	3	6
SEEC102	English	2	0	0	0	2	2
SEEC103	Language Lab	0	0	1	0	1	2
SEEC104	Universal Human Values	2	1	0	0	3	3
SEIP100	Induction Programme	0	0	0	0	0	-
MEBT100	Manufacturing Practices Workshop	0	0	2	0	2	4
CSBT100	Programming for Problem Solving	2	0	0	0	2	2
CSBT101	Programming Lab	0	0	2	0	2	4
					Total Credits	**24**	41

Semester II

Course code	Course Title	L	T	P	S	CR	CH
DDBD105	Form Studies I: Geometry, Structure and Design of 3 Dimensional Forms	0	0	0	3	3	6
DDBD106	Creativity and Ideation Workshop	0	0	0	2	2	4
DDBD107	Principles of Visual Design	0	0	0	3	3	6
SEEC105	Basic Electronics	2	1	1	0	4	5
EEBT100	Basic Electrical Engineering	2	1	0	0	3	3
EEBT101	Basic Electrical Engineering Lab	0	0	1	0	1	2
CEBT100	Engineering Graphics and Design	1	0	2	0	3	5
SEEC100	Environmental Sciences	2	0	1	0	0	3
SESP100	Sports and Yoga	2	0	2	0	0	6
					Total Credits	**19**	40

Semester III

Course code	Course Title	L	T	P	S	CR	CH
DDBD201	Form Studies II: Design of 3-Dimensional Product Forms	0	0	0	3	3	6
DDBD202	Ergonomics I	1	0	0	2	3	5
DDBD203	Design Science	0	0	0	3	3	6
DDBD204	Visual Communication Theory	1	0	0	2	3	5
DDBD205	User Experience Study	0	0	0	3	3	6
DDBD206	Physical 3D Modeling	0	0	0	3	3	6
SEEC200	Engineering Economics and Entrepreneurship	3	0	0	0	3	3
					Total Credits	**21**	37

Semester IV

Course code	Course Title	L	T	P	S	CR	CH
DDBD207	Ergonomics II	1	0	0	2	3	5
DDBD208	Typography Fundamentals	0	0	0	3	3	6
DDBD209	Product Design I : Fundamentals	1	0	0	2	3	5
DDBD210	User Experience Design	0	0	0	3	3	6
DDBD211	Digital Prototyping	0	0	0	3	3	6
DDBD212	Design Project-I	0	0	0	6	6	12
					Total Credits	**21**	40

Semester V

Course code	Course Title	L	T	P	S	CR	CH
DDBD301	Materials and Manufacturing Processes for Design Professionals	2	0	0	1	3	4
DDBD302	Introduction to Narratives	0	0	0	3	3	6
DDBD303	Design, Technology and Innovation	1	0	0	2	3	5
DDBD304	Information Graphics and Visualization	0	0	0	3	3	6
DDBD305	Interaction Design I	0	0	0	3	3	6
DDBD306	Design Colloquium	0	0	0	2	2	4
DDBDXXX	Department Elective 1	-	0	0	-	3	-
SEEC302	Open Elective 1 (Finance & Accounting)	3	0	0	0	3	3
SEEC303	Essence of Indian Knowledge Tradition	1	0	0	0	0	1
					Total Credits	**23**	

List of Department Elective 1							
Course code	**Course Title**	**L**	**T**	**P**	**S**	**CR**	**CH**
DDBD307	Ergonomics in Automotive Design	1	0	0	2	3	5
DDBD308	Design and Healthcare	0	0	0	3	3	6

Semester VI

Course code	Course Title	L	T	P	S	CR	CH
DDBD309	Product Design II : Ideas to Innovation	0	0	0	3	3	6
DDBD310	Product Architecture	1	0	0	2	3	5
DDBD311	Interaction Design II	0	0	0	3	3	6
DDBD312	Product Semantics	0	0	0	3	3	6
DDBD313	Design Project-II	0	0	0	6	6	12
DDBDXXX	Department Elective 2	0	0	0	3	3	6
SEEC300	Professional Practice, Law & Ethics of engineering	3	0	0	0	0	3
SEEC301	Constitution of India	1	0	0	0	0	1
	Total Credits					**21**	45

List of Department Elective 2							
Course code	**Course Title**	**L**	**T**	**P**	**S**	**CR**	**CH**
DDBD314	Designing with Communities	0	0	0	3	3	6
DDBD315	Rapid Prototyping and Development	0	0	0	3	3	6

Semester VII

Course code	Course Title	L	T	P	S	CR	CH
DDBD401	Design Management and Entrepreneurship	1	0	0	2	3	5
DDBD402	UX of Emerging Technologies	2	0	0	2	4	6
DDBD403	Design Project-III	0	0	0	8	8	16
DDBD404	Summer Design Internship	0	0	0	0	2	0
DDBDXXX	Department Elective 3	0	0	0	3	3	6
XXxxx	Open Elective 2 *(Courses from other departments)*	-	-	-	-	3	-
					Total Credits	**23**	33

List of Department Elective 3							
Course code	**Course Title**	**L**	**T**	**P**	**S**	**CR**	**CH**
DDBD405	Educational Game Design	0	0	0	3	3	6
DDBD406	Universal Design	0	0	0	3	3	6

Semester VIII

Course code	Course Title	L	T	P	S	CR	CH
DDBD407	Design Project-IV	0	0	0	12	12	24
DDBDXXX	Department Elective 4	0	0	0	3	3	6
					Total Credits	**15**	30

List of Department Elective 4							
Course code	**Course Title**	**L**	**T**	**P**	**S**	**CR**	**CH**
DDBD408	Nature Inspired Design	0	0	0	3	3	6
DDBD409	Automotive Styling	0	0	0	3	3	6

Semester IX

Course code	Course Title	L	T	P	S	CR	CH
DDMD531	Design Research Methodology	2	0	0	2	4	6
DDMD532	Usability Engineering	2	0	0	2	4	6
DDMD533	Design Project (Major) I	0	0	0	8	8	16
DDMD534	Design Research Seminar (focused on scientific writing)	1	0	0	1	2	3
DDMD5xx	Department Elective	2	0	0	2	4	6
					Total Credits	**22**	

List of Department Elective From M.Des course							
Course code	**Course Title**	**L**	**T**	**P**	**S**	**CR**	**CH**
DDMD537	Handicraft and Handloom Studies	2	0	0	1	3	4
DDMD538	Principles of Sustainable Design	2	0	0	2	4	6

Semester X

Course code	Course Title	L	T	P	S	CR	CH
DDMD541	Design Project (Major) II	0	0	0	14	14	-
					Total Credits	**14**	

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 101	L	T	P	S	CR	CH
Course Name:	Design History	0	0	0	3	3	6

Course Objectives:

- Explore the history of design and its pivotal turning points in shaping the discipline's contemporary landscape.
- Understand the evolution and impact of design history from prehistoric times to the present day.
- Study of art movements and development of design schools.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of design history.
- **CO2 –** Students will explore the historical evolution of art and design from prehistoric times to the present.
- **CO3 –** Students will learn the significance of art movements and design schools.

Syllabus:

- **Design History:** Introduction to design, Early design reforms, Design history basics on: Dress and textiles, Ceramic history, Furniture history, Industrial design and Graphic design. Design Globalization across the Asia–Europe–American landscapes.
- **Art Movements:** Art Nuoveau; Art Deco, Werkbund to Bauhaus, Bauhaus : influence on product design. Asian Design Movements and Arts: Japanese Design: Mingei and Wabi-Sabi; Chinese Design: Guohua and Chinese art.
- **Design Schools:** Bauhaus impact on furniture design. ULM school of design, its development phases and impact on design society. Sulliven contributions, Eclecticist countermovement, etc. Southeast Asian traditional crafts like batik and shadow puppetry.

Textbooks:

- Conway H. *Design History: A Students Handbook* (Routledge, 1987)
- Burdek B. E. *Design: History, Theory and Practice of Product Design* (Birkhauser Verlag AG, 2005)
- Bhattacharya S.K. *Trends in Modern Indian Art* (MD Publications Pvt. Ltd., 1994.)

Reference Books:

- Anker P. *From Bauhaus to Ecohouse: A History of Ecological Design* (Louisiana State University Press, 2010)
- Raizman D. *History of Modern Design* (Laurence King Publishing, 2010)
- Walker J. A. *Design History and The History of Design* (Pluto Press, 1990)
- Meggs, P. B., & Purvis, A. W. *Meggs' history of graphic design. (*John Wiley & Sons, 2016)
- Tagore, R., & Siva Kumar, R*. The last harvest: paintings of Rabindranath Tagore.* (Mapin Publishing Pvt. Ltd, 2011).
- Koren, L. Wabi-Sabi: for Artists, Designers, Poets & Philosophers. (Imperfect Publishing, 2008).
- Caraway, C. Southeast Asian Textile Designs. (Stemmer House Publishers Inc., U.S., 1994).

Approach:

- Studio sessions, and case studies to train students in the aspects of design history and schools.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

Course Number:	DDBD102	L	T	P	S	CR	CH
Course Name:	Elements of Design	0	0	0	3	3	6

Course Objective:

- The objective of the course is to teach elements of design and their applications in creative outputs.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Learn various elements of visual design.
- **CO2 –** Select and apply elements of design creatively in their assignments/other design outputs.

Syllabus:

Understanding the basic elements of design: Point/Dot and its characteristics; Line: different types of lines, qualities of lines, Shape: types of shapes, Form/Volume in two dimensions; Texture: types and applications; creating compositions using the elements. The Science of Color Theories (Light & Pigment Theories); History and functions of the basic Colour Wheel; Science of Colour mixing (Subtractive & Additive colour mixing principles).

Textbooks:

- Samara Timothy, Design Elements, 2nd Edition: Understanding the rules and knowing when to break them, Rockport Publishers, 2014
- Evans Poppy, Thomas Mark A., Exploring the Elements of Design, Delmar Cengage Learning, 2012
- White Alex W., The Elements of Graphic Design, Allworth Press, 2011

Reference Books:

- Itten J., The art of colour: the subjective experience and objective rationale of colour, John Wiley and Sons., 1974
- Gage, J., Colour and meaning : art, science and Singapore: Thames & Hudson symbolism, 1999
- Sherin, A., Design Elements, Color Fundamentals: A Graphic Style Manual for Understanding How Color Impacts Design, Beverly, Mass: Rockport Publishers, 2011
- Wong, Wucius. Principles of form and design. John Wiley & Sons, 1993.

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

Course Number:	DDBD103	L	T	P	S	CR	CH
Course Name:	Representation Techniques	0	0	0	3	3	6

Course Objective:

- The objective of the course is to introduce and train undergraduate design students in various representation techniques.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Select and apply suitable representation techniques in their assignments/other design outputs for better communication of ideas.
- **CO2 –** Document and present their design work in the form of design portfolio.

Syllabus:

- Important role of design presentation through drawings and visual media.
- Understanding geometry of elements in products and its application in object drawing.
- Study of light and shadow, Perspectives and Object drawing, Viewpoints, Surface detailing of products: Buttons, Displays, Edges etc.
- Isometric and Orthographic Drawing.
- Use of various media in representing ideas like pencil, ink and color.
- Live sketching of people, object, and animals.
- Presenting thoughts and ideas in design through sketches, perspective, Wire frame models, cutaway sections and exploded views.
- Presentation of product design concepts through simplified graphics presentation.
- Creating a Portfolio: Understanding various aspects of building portfolio.

Textbooks:

- Koos Eissen and Steur, Roselien., Sketching: Drawing techniques for product designers. 2008, Page One Publishing Pte Ltd.
- Henry, Kevin. Drawing for product designers. Laurence King Publishing, 2012.
- Pogany, Willy; The Art of Drawing, Publisher: Madison Books, 1996.

Reference Books:

- Powell, Dick; Design Rendering Techniques: A Guide to Drawing and Presenting Design Ideas, Publisher: North Light Books, 1996.
- McKim, Robert; Experiences in Visual Thinking, Publisher: Brooks/ Cole Publishing Company, 1980.
- Buxton, Bill; Sketching User Experiences: Getting the Design Right and the Right Design (Interactive Technologies), Morgan Kaufmann, 2007.
- Caplin, Steve; Banks, Adam; The Complete Guide to Digital Illustration, Publisher: Watson-Guptill Publications, 2003.
- Robertson, Scott. and Bertling, Thomas. How to draw: drawing and sketching objects and environments from your imagination. Design Studio Press, 2013.

Approach:

- Studio sessions to train students in sketching and presentation techniques.
- Sketching exercises to improve the hand mind coordination.
- Individual assignments.

Evaluation Criteria:

- Performance in individual assignments.
- Final submission of classwork.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 104	L	T	P	S	CR	CH
Course Name:	Indian Art, Craft and Design	0	0	0	3	3	6

Course Objectives:

- Concepts, principles, and overview of Indian contemporary arts practice.
- Explore and understand the history of Indian arts and craft design.
- Understand the evolution and impact of Indian art and craft.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of the Indian art and craft.
- **CO2 –** Students will explore the historical evolution of art and craft design.
- **CO3 –** Students will submit a report on observations carried out during the field visit.

Syllabus:

- Introduction, overview and interpretation of art and craft history in India. Indian Design Movements and Arts: Introduction to Gandhara School of Art, Mathura School of Art, Santiniketan Murals, Bengal School of Art, Contemporary Art in Baroda, etc., Art and Craft mapped through different states and their GI marks.
- An overview of metal crafts, bamboo, cane, glass, clay, wood, jewelry, textile, paper etc. An introduction to Indian paintings (Deccan painting, miniature paintings, etc), Modern and contemporary painters, Changing perspectives with globalization on art and crafts.
- Field visits to organizations and institutions that support arts and craft-based activities. Talks and hands on session by artists, writers, filmmakers, and craftsmen.

Textbooks:

- Aditi R*. Handmade in India: Crafts of India* (Mapin Publishing Pvt.Ltd, 2009)
- Bhattacharya S.K. *Trends in Modern Indian Art* (MD Publications Pvt. Ltd., 1994.)
- Tagore R, *Siva Kumar R. The last harvest: Paintings of Rabindranath Tagore*.(Mapin Publishing Pvt. Ltd, 2011).

Reference Books:

- Bahl K. S. *5000 years of Indian Art* (Lustre, 2012)
- Rao A. Ketkar S. *The History of Indian Art* (Jyotsna Prakashan, 2017)
- Pande A, *Indian Art, the New International Sensation: A Collector's Handbook* (Manjul Publishing House, 2008)
- Subramanyam K.G. *Moving Focus : Essays On Indian Art* (Seagull Books, 2006)

Approach:

- Studio sessions, and field visits to train students in the aspects of Indian art and crafts.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

Course Number:	DDBD 105	L	T	P	S	CR	CH
Course Name:	Form Studies I: Geometry, Structure and Design of 3 Dimensional Forms	0	0	0	3	3	6

Course Objective:

- The objective of the course is to introduce and train undergraduate design students to the basics of three-dimensional form design.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Analyze the three-dimensional forms in various artifacts.
- **CO2 –** Select and apply suitable principles of three-dimensional form design creatively in their assignments/other design outputs.

Syllabus:

- Order in Space: Construction of Platonic and Archimedean solids.
- Geometry of Design: Proportions, Golden Section, Root Rectangles, Geometric analysis.
- Design of three-dimensional structures: Serial planes, wall structures, Prisms & cylinders, Linear layers, Interlinking lines.

Textbooks:

- Critchlow, Keith. Order in space: a design source book. 1969.
- Elam, Kimberly. Geometry of design: studies in proportion and composition. Princeton Architectural Press, 2001.
- Wong, Wucius. Principles of form and design. John Wiley & Sons, 1993.

Reference Books:

- K. Critchlow; Order in Space: A design Source Book, Thames and Hudson, 1969
- E. H. Gombrich; The Sense of Order, Phaidon Press, 1994

Approach:

- Studio sessions to train students in form generation.
- Case study presentations.
- Individual assignments.
- Group Assignments.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	**DDBD 106**	**L**	**T**	**P**	**S**	**CR**	**CH**
Course Name:	**Creativity and Ideation Workshop**	**0**	**0**	**0**	**2**	**2**	**4**

Course Objectives:

- The course is tailored to provide a holistic overview of the design thinking process through hands-on activities.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of the design thinking process.

Syllabus:

- Introduction to Design Thinking. Design Process (Define, research, ideate, refinement, prototype, and implement) Research: Identify and gather information target groups. Idea generation: Basic design direction, themes of thinking and brainstorming, sketching and presenting ideas. Refinement: Thinking in shapes, colours, proportions, images and signs, visual metaphors. Prototyping: Basics and its types. Implement: Surface finish, aesthetics, and Materials.

Textbooks:

- Ambrose G. and Harris P. *Basics Design: Design Thinking* (AVA Publishing,2009)
- Meinel C. Leifer L. and Plattner H. *Design thinking: Understand – improve - apply* (Springer, 2011)

Reference Books:

- Cross N. *Design Thinking: Understanding How Designers Think and Work* (Berg Publishers, 2011)
- Petroski H. *Invention by design: How engineers get from thought to thing* (Harvard University Press, 1998)
- Ulrich K. and Eppinger S. *Product Design and Development* (McGraw-Hill Education, 2011)

Approach:

- Studio sessions to train students in the aspects of design thinking.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

Course Number:	DDBD 107	L	T	P	S	CR	CH
Course Name:	Principles of Visual Design	0	0	0	3	3	6

Course Objective:

- The objective of the course is to teach principles of visual design to the undergraduate design students.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Identify the principles of visual design in various artifacts.
- **CO2 –** Select and apply the principles of visual design creatively in their assignments/other design outputs.

Syllabus:

Study of visual principles - Balance: Formal and informal balance; Harmony / Unity; Emphasis / Focus; Rhythm: different types of rhythm; Pattern; Contrast; Scale and proportion; Visual hierarchy; Visual Order and Chaos; Positive - Negative space; Tessellation: Regular and Semi-regular tessellation, modular tessellations

Textbooks:

- Wong, Wucius. Principles of Two Dimensional Design. Canada: John Wiley & Sons, 1972
- Pipes, Alan. Foundations of Art and Design. Laurence King Publishing, 2008
- Poopy Evans, Mark Thomas. Exploring the Elements of Design. Thomson Delmar Learning, 2008

Reference Books:

- Gonnella, Rose., Navetta, Christopher and Friedman, Max. Design Fundamentals: Notes on Visual Elements and Principles of Composition. Peachpit Press, 2015
- Lidwell, William and Holden, Kritina. Universal Principles of Design. Rockport Publishers, 2010
- Bryan, Peterson. Design Basics for Creative Results, How Design Books, 2003

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

Course Number:	DDBD 201	L	T	P	S	CR	CH
Course Name:	Form Studies II: Design of 3-Dimensional Product Forms	0	0	0	3	3	6

Course Objective:

- The objective of the course is to introduce and train undergraduate design students to the design of three-dimensional product forms.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Analyze three dimensional forms and elements in designed artifacts.
- **CO2 –** Select and apply suitable principles of three-dimensional form design creatively to design product forms.

Syllabus:

- Three-dimensional visual analysis: Elements and their Properties, Movements, Forces, Relationships, and Organization among various elements of the three-dimensional form.
- Form Development for Three-Dimensional Products: Methods used in Form Design, Form factors for product design, Appearance of the product, Expressions in product forms.
- Nature and Form: Nature as source of inspiration for form, Observation of natural forms, Laws in natural forms, Principles in natural forms, Concept of abstraction.

Textbooks:

- Wong, Wucius. Principles of form and design. John Wiley & Sons, 1993.
- Hannah, Gail Greet. Elements of design: Rowena Reed Kostellow and the structure of visual relationships. Princeton Architectural Press, 2002.
- C. Akner-Koler, Three-Dimensional Visual Analysis, Institutionen for Industridesign, Konftfack, Sweden, 1994.
- Verma S.K., Punekar R.M. (2021) Decoding Nature-Inspired Form Generation Processes. In: Chakrabarti A., Poovaiah R., Bokil P., Kant V. (eds) Design for Tomorrow—Volume 3. Smart Innovation, Systems and Technologies, vol 223. Springer, Singapore.

Reference Books:

- J.Itten, Design and Form, John Wiley and Sons, 1975.
- Macnab, Maggie. Design by nature: Using universal forms and principles in design. New Riders, 2011.
- Bergdoll, Barry, et al. Nature Design: From Inspiration to Innovation. Switzerland: Lars Publishers, 2007.
- K. Critchlow, Order in Space: A Design Source Book, Thames and Hudson, 1969.
- Kimberly Elam, Geometry of Design: Studies in Proportion and Composition, Princeton Architectural Press, 2001

- Thompson, Darcy Wentworth, and D'Arcy W. Thompson. On growth and form. Vol. 2. Cambridge: Cambridge university press, 1942.

Case Studies:

- Industrial design case studies on famous designs in context of form.

Approach:

- Studio sessions to train students in form generation.
- Case study presentations.
- Individual assignments.
- Group Assignments.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 202	L	T	P	S	CR	CH
Course Name:	Ergonomics: I	1	0	0	2	3	5

Course Objectives:

- The course will outline the fundamentals and principles of ergonomics.
- To understand and apply ergonomics principles in an industrial setting.
- The course will provide an overview of anthropometry, postures, and biomechanics.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of ergonomics principles.
- **CO2 –** Students will learn about anthropometry, postures, and biomechanics.
- **CO3 -** A course project to be carried out to apply the methods discussed in real-life scenarios.

Syllabus:

- Introduction, history, and overview of ergonomics. HME model, Ergonomics and human factors: Domain philosophy and objective. Work physiology. Musco- skeleton disorder and its issues, Human body, its structure and function, body growth and somatotypes, Anthropometry: Static and dynamic anthropometry.
- Postures: Overview of various posture accessing tools (Reba Rula etc.), posture and job relation, posture, and body supportive devices, measuring techniques, statistical treatment of data. An overview of Biomechanics and its applications.
- Vertical and Horizontal work surface. Humanizing design: Design and human compatibility, comfort and adaptability aspects, Usability aspects.
- Industrial Environmental Factors and Ergonomics: Overview of workplace hazards (physical, chemical, biological, and psychosocial) and their impact on worker health and performance. Importance of safety measures in ergonomic design, and strategies for risk assessment, control, and prevention.

Textbooks:

- Bridger R. S. *Introduction to Ergonomics* (McGraw-Hill, 1995)
- Sanders M. S. and McCormick E. J. *Human Factors In Engineering and Design* (McGrawHill Publications, 1993)
- Karwowski W. *Occupational Ergonomics: A Practical Approach*. (CRC Press, 2005).

Reference Books:

- Kroemer K. H. E. and Kroemer A. D. *Office Ergonomics* (Taylor and Francis, 2001)
- Chakrabarti D. *Indian Anthropometric Dimensions for Ergonomic Design Practice* (National Institute of Design Ahmedabad, 1997)
- Dekker S. *Safety Differently: Human Factors for a New Era of Safety*. (CRC Press, 2014).

Approach:

- Lecture, Studio sessions, field visit and case studies to train students in the aspects of ergonomics in industrial perspective.

Evaluation Criteria:

- Students will be evaluated based on their performance in assignments (group /individual), final presentation outcomes (e.g., problem areas, the scope of improvements, design research methods implemented, design concepts, report, and presentation), sessional tests, mid / end-semester examinations and presentations/report.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 203	L	T	P	S	CR	CH
Course Name:	Design Science	0	0	0	3	3	6

Course Objective:

- The objective of the course is to introduce and train undergraduate design students for a systematic approach to design.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** apply various techniques for problem-solving in a systematic approach.
- **CO2 –** select and apply suitable design method in their design projects as per the project requirement.

Syllabus:

- ***Developments in design methods* -** History of design methods, Introduction to various design methods by: Alexander, Banathy, Nigel Cross, IDEO, Double Diamond by UK Design Council.
- **Three stages of a design method:**
    - ***Divergence*** - Stating objectives, literature searching, interviewing, questionnaires, investigating user behavior)
    - ***Transformation*** - Brainstorming, synectics, removing mental blocks, morphological charts, interaction matrix, AIDA-Analysis of Interconnected Decision Areas.
    - ***Convergence*** - checklists, selecting criteria, ranking, and weighting.
- **Application of design tools and different techniques for creative problem solving.**

Textbooks:

- John Chris Jones.: Design Methods – Seeds of Human Futures, Wiley & sons, 1962
- Ulrich Karl T, Eppinger Steven D.: Product Design and Development, Tata McGraw-Hill, 2004

Reference Books:

- Bryan Lawson.: How Designer's Think: the design process demystified, Architectural Press,2005.
- James Garrat.: Design and Technology, Cambridge, 1995

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 204	L	T	P	S	CR	CH
Course Name:	Visual Communication Theory	1	0	0	2	3	5

Course Objective:

- The objective of the course is to teach undergraduate design students the process of communication and the theories involved in the development of a visual language.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Identify principles of visual communication in designed artifacts.
- **CO2 –** Select and apply suitable principles of visual communication in design of creative outputs.

Syllabus:

Defining communication in design; Basic visual principles for visual layouts; Communication Models: Shannon/Weaver model, Emmert/Donaghy model, Berlo's message components; Introduction to Gestalt laws of perception, Law of pragnanz, Similarity, Proximity, Symmetry and Order, Figure and Ground, Continuity, Closure; Application of gestalt principles in communication design; Model of Communication for attention, memory and action; Two brain model; Information theory for design, Application of Information theory in communication design.

Color studies on product perception: Color interaction and their impact on product form perception.

Textbooks:

- Davis, M., Graphic Design Theory. Thames & Hudson. 2012.
- Baldwin, J., Lucienne. R., Visual Communication, from theory to practice, AVA Publishing SA, 2006

Reference Books:

- Lidwell, W., Holden, K., Butler, J., Universal Principles of Design, Rockport Publishers, 2010.
- Williams, R., Newton, J., Visual Communication: Integrating Media, Art, and Science, Routledge, 2007
- Miller, G., Information and memory: In perception Mechanisms and models, ed. R. Held and W. Richards, W.H. Freeman and Co., San Francisco, 1972
- Mole, A., Information theory and aesthetic perception, University of Illinois press, 1968
- Chandler, D. Semiotics: the basics. Routledge, 2022.

Approach:

- Class lectures
- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.

- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term examinations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 205	L	T	P	S	CR	CH
Course Name:	User Experience Study	0	0	0	3	3	6

Course Objective:

- The objective of the course is to teach undergraduate design students the fundamentals of conducting user experience research and analysis of collected data to propose a design solution that meets the target users' needs.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** conduct user research to discover problem areas / scope of improvement / user needs.
- **CO2 –** interpret collected data to propose a design solution that meets the target users' needs.

Syllabus:

- ***Research planning:*** Setting goals, integrating research and action, format of plan, Budgets.
- ***Understanding tools and methods:*** Recruiting and Interviewing, Focus Groups, Object-Based Techniques, Learning from Observation, Diary Studies, Usability Tests, Surveys, Global and Cross-Cultural Research, Published Information and Consultants. Introduction to Defining User's Cohorts, Building Persona, Heuristic principles etc.
- ***Analysis:*** Analyzing Qualitative Data, Usage Data and Customer Feedback. Quantitative techniques: A/B testing, Prioritization matrix, etc.
- ***Communicating Results:*** Representing Insights as Deliverables, Reports, Presentations, and Workshops.

Textbooks:

- Goodman, E., Kuniavsky, M., & Moed, A. (2012). Observing the user experience: A practitioner's guide to user research. Elsevier Morgan Kaufmann.

Reference Books:

- Holtzblatt, K., & Beyer, H. (1997). Contextual design: defining customer-centered systems. Elsevier Morgan Kaufmann.
- Hackos, J. T., & Redish, J. (1998). User and task analysis for interface design (Vol. 1). New York: Wiley.

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.

- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through, mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	**DDBD 206**	**L**	**T**	**P**	**S**	**CR**	**CH**
Course Name:	**Physical 3D Modelling**	**0**	**0**	**0**	**3**	**3**	**6**

Course Objectives:

- To provide students with hands on training on various tools, equipment's and machines used during product design.
- To understand the process of design and to create solutions to existing products.

Course Outcomes/Learnings

- **CO1 –** Students will learn about tools, equipment's and machines used in prototyping.
- **CO2 –** Students will develop a solution to re-design an existing product.

Syllabus:

- Hands-on training in Wood carving, Plastic welding, cutting, engraving, sheet metal works, and wire cutting, etc are some of the processes that the students will learn and use for physical prototyping.
- The students will be exposed to tools and equipment's to machine the external appearance of products of simple shapes.
- The students will also be exposed to prototyping machines and mechanisms to realize the product through demo sessions.
- Few sessions will be allocated to re-design an existing product in terms of form, size, functionality, etc.

Textbooks:

- Norman D. *The design of everyday things* (MIT Press, 1998)
- Morris R. *The fundamentals of product design* (Bloomsbury Publishing, 2017).
- Potter N. *What is a Designer: Things, Places, Messages* (Princeton Architectural Press, 2002)

Reference Books:

- Julier G. *20th Century Design* (Thames and Hudson,1993)
- Petroski H. *Invention by design: How engineers get from thought to thing* (Harvard University Press, 1998)
- Forty A. *Objects of Desire* (Thems and Hudson,1995)

Approach:

- Studio sessions to train students in the aspects of physical prototyping.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through, mid-term and end-term presentations and report.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 207	L	T	P	S	CR	CH
Course Name:	Ergonomics II	1	0	0	2	3	5

Course Objectives:

- This course will provide an overview of cognitive elements in ergonomics.
- This course will provide an overview of visual field, systems and displays.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of cognitive elements.
- **CO2** – Students will learn about visual fields, systems and displays.
- **CO3** - A course project to be carried out to apply the methods discussed in real-life scenarios.

Syllabus:

- Understanding cognitive elements and communication issues. Human sensory systems and their types. Perception and its approaches; memory and its types; selection and execution of responses. Visual and auditory display design; Human cognitive abilities and limitations. Fitt's law, Hick's law. Human error, reliability, and risk perception. Common tasks and design guidelines in cognitive ergonomics. Assessment techniques
- Visual field and system - distant objects, brightness, adaptation, and visual performance. Visual displays - vision and magnification overview and displays, illumination aspects in workplace and devices—assessment and measuring visual environment.

Textbooks:

- Anshel J. Visual Ergonomics Handbook (CRC Press, 2005)
- Kellogg R.T. *Fundamentals of Cognitive Psychology* (Sage Publications, 2012)
- Karwowski W. Soares M. M. and Stanton N. A. *Human factors and ergonomics in consumer product design: Uses and Applications* (CRC Press, 2011)

Reference Books:

- Hollnagel E. *Handbook of Cognitive Task Design*. (Lawrence Erlbaum Associates Publishers, 2003)
- Visser W. *The Cognitive Artifacts of Designing* (Lawrence-Erlbaum Associates Publishers, 2006)
- Kroemer K. H. E. and Kroemer A. D. *Office Ergonomics* (Taylor and Francis, 2001)
- Chakrabarti D. *Indian Anthropometric Dimensions for Ergonomic Design Practice* (National Institute of Design Ahmedabad, 1997)

Approach:

- Lecture, Studio sessions, and case studies to train students in the aspects of visual and cognitive elements in ergonomics.

Evaluation Criteria:

- Students will be evaluated based on their performance in assignments (group /individual), final presentation outcomes (e.g., problem areas, the scope of improvements, design research methods implemented, design concepts, report, and presentation), mid / end-semester presentations/report.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 208	L	T	P	S	CR	CH
Course Name:	Typography Fundamentals	0	0	0	3	3	6

Course Objectives:

- The course aims to introduce the fundamentals and historical developments in typography.
- Understand the principles and concepts of typography such as letterforms, layout, and grid systems.
- Exploration and Implementation of typography in various mediums such as books, mailers, new media, posters and signages

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of the basics and history of typography.
- **CO2 –** Students will learn typography concepts and principles in detail.
- **CO3 –** Students will learn the application of typography on various medium and context.

Syllabus:

- Introduction; History of Typography; Anatomy of Type; Type Classifications; Letterform and Composition; Basic Typography: Type Style, Type width, Type weight; Grid systems: Types of Grids, Application of Grids; Printing: Various printing techniques.

Textbooks:

- Ambrose G. *The Fundamentals of Typography* (Bloomsbury Publishing India Private Limited, 2011)
- Tselentis. J *Type Form and Function: A Handbook on the Fundamentals of Typography* (Rockport Publishers, 2011)

Reference Books:

- Ruder E. *Typography: A Manual of Design* (Thames and Hudson, 2009)
- Raizman D, *History of Modern Design* (Laurence King Publishing, 2010)
- Bringhurst R, *The Elements of Typographic Style* (Hartley and Marks Publishers, 2013)

Approach:

- Studio sessions, and case studies to train students in the aspect's typography.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 209	L	T	P	S	CR	CH
Course Name:	Product Design I : Fundamentals	1	0	0	2	3	5

Course Objectives:

- The course is tailored to provide a holistic overview of the product design process.
- The course will outline organizing, gathering, and prioritizing user need analysis.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of the product design process.
- **CO2 –** Students will learn the significance of conducting user need analysis

Syllabus:

- Basics of Product Design, Engineering and Design, Theories, methodologies, and philosophy in design. Overview of Product development process and various stages. Systematic product design process in present and past. Reasons for failures in various products and case studies. S curve and technology forecasting. Familiarity matrix and new product development. Overview of Stage gate and spiral gate process.
- User needs analysis: Voice of customer, types and needs of customer, Gathering, organizing, and prioritizing customer needs and their associated techniques. Kano diagram for customer satisfaction and product features. Mapping customer needs with technical requirements. Benchmarking, and Quality function deployment. Product Function: Functional decomposition, Fast method. Functional structure- Flow method. An overview of Colour Material & Finish (CMF) in product design.

Textbooks:

- Ulrich K. and Eppinger S. *Product Design and Development* (McGraw-Hill Education, 2011)
- Jamnia A. *Introduction to Product Design and Development for Engineers* (CRC Press, 2018)
- Otto K. and Wood K. *Product Design: Techniques in Reverse Engineering and New Product development* (Pearson, 2001)

Reference Books:

- Morris R. *The fundamentals of product design* (Bloomsbury Publishing, 2017)
- Petroski H. *Invention by design: How engineers get from thought to thing* (Harvard University Press, 1998)
- Baxter M. *Product design - Design Toolkits* (CRC Press, 1995).

Approach:

- Lecture, Studio sessions, and case studies to train students in the aspects of product design.

Evaluation Criteria:

- Students will be evaluated based on their performance in assignments (group /individual), final presentation outcomes (e.g., problem areas, the scope of improvements, design research methods implemented, design concepts, report, and presentation), sessional tests, mid / end-semester examinations and presentations/report.

Course Number:	DDBD 210	L	T	P	S	CR	CH
Course Name:	User Experience Design	0	0	0	3	3	6

Course Objective:

- The objective of the course is to teach undergraduate design students the elements of user experience design and their application in digital products.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** analyze the digital products and identify various elements of user experience design.
- **CO2 –** apply various elements of user experience design in design of digital products.

Syllabus:

- ***Introduction to user experience:*** From Product Design to User Experience Design, Designing (for) Experience, User Experience and the Web, User Experience and Business.
- ***Five Elements of User Experience:***
  - ***The Strategy Plane:*** Product Objectives and User Needs.
  - ***The Scope Plane:*** Functional Specifications and Content Requirements.
  - ***The Structure Plane:*** Interaction Design and Information Architecture.
  - ***The Skeleton Plane:*** Interface Design, Navigation Design, and Information Design.
  - ***The Surface Plane:*** Sensory Design
- ***The Elements Applied:*** Understanding a problem and consequences of its solution**,** Asking the Right Questions.
- ***Introduction to Usability and Prototyping:*** Introduction to Usability concepts, Introduction on Lo-Fi prototyping and testing.

Textbooks:

- Garrett, Jesse James. *The elements of user experience: user centered design for the web and beyond*, 2022.

Reference Books:

- Miller, Luke. *The practitioner's guide to user experience design*. Hachette UK, 2015.
- Kraft, Christian. *User experience innovation: User centered design that works*. Apress, 2012.
- Benyon, David. *Designing user experience*. Pearson UK, 2019.

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term, and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 211	L	T	P	S	CR	CH
Course Name:	Digital Prototyping	0	0	0	3	3	6

Course Objective:

- The objective of the course is to introduce and train undergraduate design students to various digital tools used in design domain.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Use digital tools in their assignments and projects.
- **CO2 –** Convert their intangible designs into tangible products.

Syllabus:

(Following sections can be updated periodically based on the developments of software and prototyping machines)

Digital Sketching/Painting: Digital sketching/painting tools, Keys to good designs, Application of digital sketching/painting techniques through exercises on Robots, Machines, Vehicles, Spaceships and Aircrafts.

Computer Aided Design: Application of CAD tools in design**,** Introduction to Solidworks, Sketching, 3D modelling, Converting 2d sketch to 3d model, Surfacing, Assembly, Drafting, Presentation of concepts through renderings and animation.

From intangible to tangible design: 3D Printing Technologies and Materials, Designing for 3D Printing, Applications of 3D Printing.

Textbooks:

- Chiang, Doug. Mechanika, Revised and Updated: Creating the Art of Space, Aliens, Robots and Sci-Fi. Penguin, 2015.
- Tran, Paul. Solidworks 2022 Intermediate Skills: Expanding on Solids, Surfaces, Multibodies, Configurations, Drawings, Sheet Metal and Assemblies. SDC publications, 2021.
- Redwood, Ben, Filemon Schffer, and Brian Garret. The 3D printing handbook: technologies, design and applications. 3D Hubs, 2017.

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD212	L	T	P	S	CR	CH
Course Name:	Design Project - I	0	0	0	6	6	12

Course Objective:

- The objective of the course is to mentor students through the study and analysis of existing day to day products.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Identify problems in the study and analysis of existing day to day products.
- **CO2 –** Document and present identified problems related to the selected products.

Syllabus:

This project would be based on application of design principles covered in design courses.

The emphasis of the project is on individually/Group planned design projects that involve considerations of interactions with product / communication system, wide range of requirements of different users and scope for visual, formal and structural innovations.

The students will select an existing product and conduct study on it through the following steps.

- Exposure and analysis of selected product
- Introduction to the process of design
- Inquiry and Observations
- Talking and conversing with users
- Problem Identification or need finding.
- Documentation, report making and presentations.

Approach:

- Students will be supervised and guided by their design mentors.
- Students will conduct their field studies and research work during the allotted time slot of the course.

Evaluation Criteria:

- A continuous evaluation of the student will be done by the design mentor based on his/her performance throughout the project.
- A monthly evaluation of the students by the panel of design mentors.
- The mid and end-semester evaluation will be based on presentation and report submission.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

ourse Number:	DDBD 301	L	T	P	S	CR	CH
Course Name:	Materials and Manufacturing Processes for Design Professionals	2	0	0	1	3	4

Course Objectives:

The objectives of the course are:

- to teach undergraduate design students about various materials and manufacturing processes associated with them.
- to train undergraduate design students in selection of appropriate material and manufacturing process for Industrial Design/Product Design applications.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Identify various materials in the designed products.
- **CO2 –** Select the suitable material and manufacturing process for Industrial Design /Product Design projects.

Syllabus:

- ***Plastics -*** Introduction to Plastics, Manufacturing processes for plastics, Design considerations for Injection Molding, Assembly Techniques for plastics, Decorative Techniques for plastics.
- ***Metals -*** Introduction to Metals, Manufacturing processes for metals.
- ***Glass and Ceramics -*** Introduction to Ceramics and Glass, Manufacturing processes for Ceramics & Glass.
- ***Wood -*** Introduction to Wood, Manufacturing processes for wood.
- ***Selection of materials for Industrial/Product Design -*** Requirements pyramid, Product character, Five dimensions of materials, Methods for material selection in product design.
- ***Introduction to Intelligent Manufacturing -*** Artificial Intelligence for Smart Manufacturing.

Textbooks and Online course link:

- Thompson, Rob. Manufacturing processes for design professionals. Vol. 3. London: Thames & Hudson, 2007.
- Ashby, Michael F., and Kara Johnson. Materials and design: the art and science of material selection in product design. Butterworth-Heinemann, 2013.
- D'source course by Prof. Vijay. P. Bapat and Dr. Shiv Kumar Verma - Designing of Plastic Products for Injection Moulding Manufacturing Methods and Technologies (https://www.dsource.in/course/designing-plastic-products-injection-moulding).

Reference Books:

- Lesko, Jim. Industrial design: Materials and manufacturing guide. John Wiley & Sons, 2007.
- Ashby, Michael F., Hugh Shercliff, and David Cebon. Materials: engineering, science, processing and design. Butterworth-Heinemann, 2018.
- Garratt, James. Design and technology. Cambridge: Cambridge University Press, 2008.
- Beadle, John D., ed. Plastics Forming. Macmillan International Higher Education, 1971.
- Beadle, John D., ed. Metal Forming. Macmillan International Higher Education, 1971.
- Beadle, John D. Product Treatment and Finishing. Macmillan International Higher Education, 2016.

Approach:

- Class lectures
- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through sessional tests, mid-term and end-term examinations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD302	L	T	P	S	CR	CH
Course Name:	Introduction to Narratives	0	0	0	3	3	6

Course Objectives:

- Introduce the aspects of narratives, their structure, and models in storytelling contexts.
- Students will demonstrate the ability to apply theoretical knowledge to develop narratives.

Course Outcomes/Learnings

- **CO1 -** Students will gain a comprehensive understanding of various narrative forms, their structures, and storytelling techniques.
- **CO2 -** Students will develop critical thinking and provide insights into the creative process of storytelling.

Syllabus:

- Narrator and Levels of Narration, Intermediate Forms: Indirect Speech and Free Indirect speech, Narrative and non-narrative - Embedded text and their relations, Relations between Primary Fabula and Embedded Text / Fabula, Indication to the Reader/ Actor.
- Introduction, Sequential Ordering: Direction, Possibilities, Nuances of Anachrony, Distance, Kinds, Functions, Span Anticipations. Rhythm: Background, General, Ellipsis. Frequency.
- From Actors to Characters: Problems, Predictability, Construction of Contents, Filling in the Outline. From Place to Space: Place and Space, Spatial Aspects and Perception, Content and Function, Relations to other Elements, Information. Focalization: Background, objects and levels. Visual Stories: Visual Narratology in a Nutshell, Novel and Film Vision in Language

Textbooks:

- Bal M. *Narratology: Introduction to the Theory of Narratives* (University of Toronto Press, 2017)
- Paniker A. K. *Indian Narratology* (Sterling Publishers Pvt.Ltd, 2003)

Reference Books:

- Culler J. *Narrative Discourse: An Essay in Method* (Cornell University Press, 1983)
- Campbell J. *The Hero with a Thousand Faces* (Princeton University Press, 2004)
- Hart J. *The Art of the Storyboard: Storyboarding for Film, TV, and Animation* (Focal Press, 1998)

Approach:

- Studio sessions, and case studies to train students in the aspect's of Narratives.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term examinations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 303	L	T	P	S	CR	CH
Course Name:	Design Technology and Innovation	1	0	0	2	3	5

Course Objectives:

- The course outlines the implications of innovation and technology in design.
- This course will assist with creative thinking and techniques.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of innovation, technology and its aspects in design.
- **CO2** - Students will learn about creative thinking and its associated techniques.

Syllabus:

- Innovation and Invention in Design and Engineering. Innovation and its management. Collaborative Innovation Methods, Creativity and Learnings from Grassroot Innovation, Systemic Approach to Innovations. Creative thinking phenomena, Brain lateralization, Creativity techniques and tools, Imagery visualization.
- Globalization and Proliferation of Design and Technology, Stereotype population and world- wide technology, Modernization, Commitment and Consciousness, New Power Relationship- Need for Culture driven Technology.

Textbooks:

- Petroski H. *Invention by Design* (Universities Press, 2000)
- Murphie A. and Potts J. *Culture and Technology (*Macmillan Education, 2003)
- French M. *Invention and Evolution - Design in Nature and Engineering* (Cambridge University Press, 1994)

Reference Books:

- Proctor T. *The essence of Management Creativity* (Prentice Hall, 2002)
- Kroll E. Condoor S. and Janson D.G. *Innovative Conceptual Design* (Cambridge University Press, 2001)
- Morey D. Maybury M. and Thuraisingham B. *Knowledge Management* (Universities Press MIT, 2000)

Approach:

- Lecture, Studio sessions, and case studies to train students in the aspects of innovation and technology in design system.

Evaluation Criteria:

- Students will be evaluated based on their performance in assignments (group /individual), final presentation outcomes (e.g., problem areas, the scope of improvements, design research methods implemented, design concepts, report, and presentation), sessional tests, mid / end-semester examination and presentations/report.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 304	L	T	P	S	CR	CH
Course Name:	Information Graphics and Visualization	0	0	0	3	3	6

Course Objective:

- The objective of the course is to teach undergraduate design students the information design principles for creating visual graphics and visualizations.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Analyze various graphical outputs through identification of various information design principles.
- **CO2 –** Select and apply suitable information design principles to design more communicative visual graphic outputs.

Syllabus:

- Syntactic and semantic aspects of information design.
- Understanding information graphics from simple to complex representations.
- Study of visual display of quantitative and qualitative information.
- Information structuring and principles of Visualization, Visualization of events, Activity in terms of time and space representations.
- Understanding charts, maps and diagrams.
- Explorations in visualizing dynamic information.
- Design of dynamic information.

Textbooks:

- Jaques Bertin; Graphic information processing, Walter Degruyter.
- Herdeg, Walter; Graphic diagrams, The graphic press, Tufte, Switzerland.
- Tufte, Edward R; Visual display of quantitative information. Graphic Press, USA. 1993.
- Tufte, Edward R; Envisioning Information. Graphis Press
- Tufte, Edward R; Visual Explanations---images and quantities, evidence and narrative.

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term examinations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 305	L	T	P	S	CR	CH
Course Name:	Interaction Design I	0	0	0	3	3	6

Course Objectives:

- The course will provide a comprehensive overview of Interface models, paradigms, to design user interfaces through a methodological approach.
- Understand user characteristics and develop interface technology.
- Course will provide an outline on interface evaluation techniques.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of the interface design process and methodology.
- **CO2 –** Students will develop interface technology based on user needs.
- **CO3 –** Students will learn interface evaluation techniques.

Syllabus:

- Introduction, User Interface Design, Paradigms in Interaction, Overview of form, content and behavior in interaction design. User goals. Overview on Models: system, representation and mental. Interaction models based on activities, objects (metaphors, etc.). Unified Modeling Language (UML) like Activity diagrams, State Machine Diagrams etc.
- User characteristics and behaviour (perception, memory, cognition, etc.,), Interface technology (e.g., input and output devices, interaction styles, web, and immersive environments). Developing interface design for different screens (e.g., watch, mobile phone, tablet, computer, and large screen devices).
- User interface design methods: Overview on user-centered design, scenario, personas, ideation, Navigation Design, Screen Design and Layout, prototyping and visual design principles. Interface evaluation (e.g., heuristic evaluation, evaluation through user participation, benchmarks and experiments).

Textbooks:

- Galitz W. O. *The essential guide to user interface design: An introduction to GUI design principles and techniques*. (Wiley, 2002)
- Shneiderman B. Plaisant C. Cohen M. and Jacobs S. *Designing the user interface: strategies for effective human-computer interaction*. (Pearson, 2009)
- Preece J. Rogers Y. and Sharp H. *Interaction design: Beyond human computer interaction*. (John Wiley and Sons, 2002)

Reference Books:

- Garrett J. J. *The Elements of User Experience: User-Centered Design for the Web and Beyond - Voices That Matter* (New Riders, 2010)
- Krug S. *Don't Make Me Think, Revisited: A Common Sense Approach to Web Usability* (New Riders, 2014)
- Heskett J. *Toothpicks and logos: Design in everyday life* (Oxford University, 2002)

- Norman D. Emotional design: Why we love (or hate) everyday things. (Basic Books, 2003)

Approach:

- Studio sessions, and case studies to train students in the aspects of interface design.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term examinations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 306	L	T	P	S	CR	CH
Course Name:	Design Colloquium	0	0	0	2	2	4

Course Objective:

- The objective of the course is to motivate students to discuss about current trends in different domains of design.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Develop the ability to engage in informed and meaningful discussions about current trends in various design domains.
- **CO2 –** Acquire a deep understanding of the language and concepts associated with contemporary design, enabling students to articulate their thoughts effectively.

Syllabus:

- Explore current trends in product, visual, interaction and digital design through case studies.
- Examine how design trends intersect with fields of technology.
- Facilitate discussions on the adaptive nature of design in response to societal shifts.
- Develop critical analysis skills through the evaluation of emerging design trends.
- Culminate in group/individual projects where students present and discuss the implications of a chosen design trend in a specific context.

Approach:

- Studio sessions for informal meeting/seminar.
- Case study presentations.
- Individual assignments.
- Group Assignments.

Evaluation Criteria:

- Active participation in class/studio discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term examinations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 307	L	T	P	S	CR	CH
Course Name:	Ergonomics in Automotive Design	1	0	0	2	3	5

Course Objectives:

- The course will comprehensively outline the ergonomic issues, encompassing fundamental principles, design guidelines, tools, and methods in designing and evaluating automotive products.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of ergonomics principles used for designing automotive products.
- **CO2 –** Students will learn the significance of occupant packaging, driver information processing, controls, displays, interior layouts, field of view, lighting, and external interfaces.

Syllabus:

- Introduction to Automotive Ergonomics: A Brief Overview of Human Characteristics and Capabilities. Engineering Anthropometry and Biomechanics: Using Anthropometry in Designing Vehicles, Applications of Biomechanics in Vehicle Design.
- Overview on Occupant Packaging: Sequence in Development of Vehicle Package, Driver Information Acquisition and Processing: Workload, Information Processing, Human errors and distractions, Information Acquired through Other Sensory Modalities.
- An overview of Controls, Displays, and Interior Layouts, Field of View from Automotive Vehicles, Automotive Lighting, Entry and Exit from Automotive Vehicles, Automotive Exterior Interfaces: Service and Loading/Unloading Tasks, Automotive Craftsmanship, Role of Ergonomics Engineers in the Automotive Design Process.

Textbooks:

- Bhise V. D. *Ergonomics in the automotive design process* (CRC Press, 2016)
- Harvey C. and Stanton N. A. *Usability evaluation for in-vehicle systems* (CRC Press, 2016)
- Gkikas N. *Automotive Ergonomics: Driver-Vehicle Interaction* (CRC Press, 2016)

References:

- Castro C. *Human factors of visual and cognitive performance in driving*. (CRC Press, 2008)
- Regan M. A. Lee J. D. and Young K. *Driver distraction: Theory, effects, and mitigation*. (CRC Press, 2008)
- Stuart M. *H-Point: The fundamentals of car design and packaging*. (Art Center College of Design, 2009)

Approach:

- Lecture, Studio sessions, and case studies to train students in the aspects of ergonomics principles used for designing automotive products.

Evaluation Criteria:

- Students will be evaluated based on their performance in assignments (group /individual), final presentation outcomes (e.g., problem areas, the scope of improvements, design research methods implemented, design concepts, report, and

	presentation) sessional tests, mid / end-semester examination and presentations/report.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 308	L	T	P	S	CR	CH
Course Name:	Design and Healthcare	0	0	0	3	3	6

Course Objectives:

- To teach undergraduate design students the process of innovating medical technologies.
- To teach undergraduate design students the fundamentals of designing environments/spaces for healthcare systems.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Design and develop medical devices, diagnostics, and other technologies.
- **CO2 –** Design and develop environments/spaces for healthcare systems.

Syllabus:

- ***Design of Medical Devices, diagnostics, and other technologies***
    - ***Biodesign innovation process***
        - ***Identify:*** Needs Finding, Needs Screening.
        - ***Invent:*** Concept Generation, Concept Screening.
        - ***Implement:*** Strategy Development, Business Planning.

- ***Design of environments/spaces for healthcare systems:*** General Elements of Healthcare; Codes, Regulations and Industry Standards; Specialized Facility and Mechanical Requirements; The Built Environment's Role; Holistic Analysis; Room Requirements; Major Specialties; Lighting; Interior Finishes + Furniture; Biophilia.

Textbooks:

- Yock, Paul G., ed. Biodesign. Cambridge University Press, 2015.
- Karlen, Mark, Saglinda H. Roberts, and Kyra K. Tucker. Healthcare Design Basics. John Wiley & Sons, 2023.

Reference Books:

- Ogrodnik, Peter J. Medical device design: innovation from concept to market. Academic Press, 2019.
- Singha, Sumita. Future healthcare design. Routledge, 2020.
- Jones, Peter. Design for care: Innovating healthcare experience. Rosenfeld Media, 2013.

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 309	L	T	P	S	CR	CH
Course Name:	Product Design II : Ideas to Innovation	0	0	0	3	3	6

Course Objectives:

- The course will provide an overview of various design toolkits for concept generation and selection.
- The course will outline the basics of prototyping and its importance.
- The course will provide an overview of the importance of ergonomics, aesthetics sustainability and environmental impact on product design.

Course Outcomes/Learnings

- **CO1 -** Students will gain a comprehensive knowledge of various design toolkits.
- **CO2** - Students will learn about prototyping and its importance.
- **CO3** - Students will understand the importance of ergonomics, aesthetics, sustainability, and environmental issues in product design.

Syllabus:

- Discussion on conventional brainstorming, mind maps, and aids used for information gathering. Introduction to Idea generation through various Design Toolkits, Concept development through intuitive/directed methods, Selection, screening, and ranking of design concepts.
- Introduction and historical perspective on prototyping. Various methods, goals and types, uses and mechanisms of prototyping. Rapid prototyping and its mechanisms. Guidelines for prototyping and product architecture. Ergonomics in Product Design. An overview: Usability and Aesthetics, Biomimicry and Nostalgic Design, Design for Manufacturing and Assembly (DFMA), Environmental Considerations in Product Design, and Sustainability in Product Design. Application of Colour Material and Finish (CMF) in product design.

Textbooks:

- Ulrich K. and Eppinger S. *Product Design and Development* (McGraw-Hill Education, 2011)
- Jamnia A. *Introduction to Product Design and Development for Engineers* (CRC Press, 2018)
- Otto K. and Wood K. *Product Design: Techniques in Reverse Engineering and New Product development* (Pearson, 2001)

Reference Books:

- Morris R. *The fundamentals of product design* (Bloomsbury Publishing, 2017)
- Petroski H. *Invention by design: How engineers get from thought to thing* (Harvard University Press, 1998)
- Baxter M. *Product design - Design Toolkits* (CRC Press, 1995)

Approach:

- Studio sessions, and case studies to train students in the aspects of product design.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.

- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	**DDBD 310**	**L**	**T**	**P**	**S**	**CR**	**CH**
Course Name:	**Product Architecture**	**1**	**0**	**0**	**2**	**3**	**5**

Course Objectives:

- The course will develop an understanding of the functional embodiment of design systems.
- The course will briefly cover product architecture, configuration, and parametric phases in embodiment design.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of the embodiment design process.
- **CO2** – Students will consider the influence of product architecture, configuration, and parametric design phases while developing products.

Syllabus:

- Introduction to Embodiment design and its phases.
- Product architecture: Modular and integrated design, detailing mechanisms for foldable, stackable, and collapsible considerations in product architecture.
- Configuration design: Selection of natural, synthetic, and manmade materials in design.
- Parametric design: Design for manufacture and assembly. Batch production and mass production of products. Design Guidelines and Practices.
- Technical considerations of internal subsystems of a product and their influence on detailing.

Textbooks:

- Boothroyd G. *Product Design for Manufacture and Assembly* (Marcel Dekker, 2002)
- Gordon J.M. *Industrial Design of Plastics Products* (John Wiley and Sons, 2003)

Reference Books:

- Erdman A. G. and Sandor G.N. *Mechanism design: analysis and synthesis*, *Volume 1 and 2* (Prentice-Hall, 1984)
- Waldron K. J. and Kinzel G. L. *Kinematics, Dynamics, and Design of Machinery* (Wiley Publications, 2003)

Approach:

- Lecture, Studio sessions, and case studies to train students in the aspects and phases of embodiment design.

Evaluation Criteria:

- Students will be evaluated based on their performance in assignments (group /individual), final presentation outcomes (e.g., problem areas, the scope of improvements, design research methods implemented, design concepts, report, and presentation) sessional tests, and mid / end-semester examination and presentations/report.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 311	L	T	P	S	CR	CH
Course Name:	Interaction Design II	0	0	0	3	3	6

Course Objectives:

- The course will provide a comprehensive overview of fundamentals and methodology used in Interaction design.
- Course will provide an outline on developing interaction design prototypes and its evaluation.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of the interaction design process and methodology.
- **CO2 –** Students will learn evaluation of interaction design.

Syllabus:

- Evolution of Interaction Design, Human-Computer Interaction: Methodologies, Models and Process of Conceptual Design.
- HCI models such as Descriptive (Gulf of Execution/ Evaluation, etc) and Predictive Models (GOMS, KLM, TAM etc.)
- Overview of Usability concepts, Accessibility, Social and Emotional aspects of Interaction Design, Iteration and Prototyping, Rules and Heuristics Principles, Design Prototyping and Construction Methods, Ethics in Design, Case study and examples on Human computer interaction.

Textbooks:

- Dix. *Human-Computer Interaction* (Pearson Education India, 2004)
- Galitz W. O. *The essential guide to user interface design: An introduction to GUI design principles and techniques*. (Wiley, 2002)
- Preece J. Rogers Y. and Sharp H. *Interaction design: Beyond human computer interaction*. (John Wiley and Sons, 2002)

Reference Books:

- Shneiderman B. Plaisant C. Cohen M. and Jacobs S. *Designing the user interface: strategies for effective human-computer interaction*. (Pearson, 2009)
- Garrett J. J. *The Elements of User Experience: User-Centered Design for the Web and Beyond - Voices That Matter* (New Riders, 2010)
- Krug S. *Don't Make Me Think, Revisited: A Common Sense Approach to Web Usability* (New Riders, 2014)
- Heskett J. *Toothpicks and logos: Design in everyday life* (Oxford University, 2002)
- Norman D. Emotional design: Why we love (or hate) everyday things. (Basic Books, 2003)

Approach:

- Studio sessions, and case studies to train students in the aspects of interaction design.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.

- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 312	L	T	P	S	CR	CH
Course Name:	Product Semantics	0	0	0	3	3	6

Course Objective:

- The objective of the course is to teach undergraduate design students the fundamentals of product semantics, product communication and meaning making in industrial/ product design.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** apply concept of message and communication in the analysis of existing products.
- **CO2 –** apply theories related to the product semantics in their design projects and design communication effective products.

Syllabus:

- ***Introduction to Semiotics -*** Basics of semiotics, Theories of signs, Saussurean model & Peircean model, Modes of signs, Signs and things, Analyzing structure.
- ***Product design as communication -*** Aesthetics of design, Product gestalt, Message and communication in product design, semiotics in product design, Semantic functions, Syntax and Pragmatics.
- ***Product semantics theories and their applications -*** Theories in product semantics, Categorization theory as a framework for product semantics, taxonomy of objects and generative approach in design.
- ***Case studies on Product forms and Semantics.***

Textbooks and Research Papers:

- Krippendorff, Klaus. The semantic turn: A new foundation for design. crc Press, 2005.
- Chandler, Daniel. Semiotics: the basics. Routledge, 2007.
- Monö, Rune G., Michael Knight, and Rune Monö. Design for product understanding: The aesthetics of design from a semiotic approach. Liber, 1997.
- Krippendorff, Klaus. "Product semantics: A triangulation and four design theories." (1989).
- Athavankar, Uday. “Beyond the Vernacular Concept of Order”.
- Athavankar, Uday A. "Categorization... natural language and design." Design Issues 5.2 (1989): 100-111.
- Athavankar, Uday. "From product semantics to generative methods." international association of societies design research Iasdr (2009).

Reference Books:

- Vihma, S (ed): Semantic vision in design: symposium on design, University of Industrial Arts (UIAH), 1990
- Rips, L.J, Schoben, E.J & Smith, E.F : Semantic distance and the verification of semantic relations, journal of verbal learning and verbal behavior, 1975, 14, 665¬681
- Athavankar, Uday. “The structure of Semantic space”.
- Athavankar, Uday. ”Natural Language and the Art of Object Creation: Are there any common Issues?”
- Athavankar, Uday. “Surface as 'Interfaces": Confronting the New Semantic Issues in Product Form”.
- Lakoff, George. Women, fire, and dangerous things: What categories reveal about the mind. University of Chicago press, 2008.

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.
- Case study presentations.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 313	L	T	P	S	CR	CH
Course Name:	Design Project – II	0	0	0	6	6	12

Course Objective:

- The objective of the course is to mentor students through the ideation and prototyping stage for the problem/need identified in Design Project I.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** ideate for the identified problem using design tools and principles.
- **CO2 –** prototype their design concepts physically and/or digitally.

Syllabus:

The outcome of the project will be in the form of innovative and conceptual design proposal that reflect the students understanding of the design process. These will be developed and presented in the form of appropriate and tangible design solutions including models, graphic solutions etc.

The solutions will be developed through following stages:

- Analysis of an identified problem in a given context
- Creativity and Ideation methods
- Design Explorations for Alternate Concepts
- Idea sketching for alternate creative solutions.
- Design Conceptualization and Visualization
- Soft Prototyping the idea/concept
- Documentation, report making and presentations.

Approach:

- Students will be supervised and guided by their design mentors.
- Students will conduct their field studies and research work during the allotted time slot of the course.

Evaluation Criteria:

- A continuous evaluation of the student will be done by the design mentor based on his/her performance throughout the project.
- A monthly evaluation of the students by the panel of design mentors.
- The end-semester evaluation will be based on presentation and report submission.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 314	L	T	P	S	CR	CH
Course Name:	Designing with Communities	0	0	0	3	3	6

Course Objective:

- The objective of the course is to teach undergraduate design students about grassroots innovation.

Course Outcomes/Learnings

By the end of this course, students will:

- **CO1 –** Learn about various grassroots innovation movements.
- **CO2 –** Apply their learnings in the design projects focused on grassroots innovations.

Syllabus:

- Introduction to Grassroots Innovation.
- An analytical framework for studying grassroots innovation movements.
- Grassroots Innovation Movements:
    - Socially Useful Production.
    - Appropriate Technology Movement.
    - People's Science Movement.
    - Hackerspaces, FabLab's and makerspaces.
    - Social Technology Network
    - Honeybee Network.
- Lessons for theory and practice.
- Sustainable Development Goals (SDGs) and Grassroots Innovation.

Textbooks:

- Smith, Adrian, et al. *Grassroots innovation movements*. Taylor & Francis, 2017.

Reference Books:

- Gupta, Anil K. *Grassroots innovation: Minds on the margin are not marginal minds*. Random House India, 2016.
- Phelps, Edmund S. *Mass flourishing: How grassroots innovation created jobs, challenge, and change*. Princeton University Press, 2013.

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	**DDBD 315**	**L**	**T**	**P**	**S**	**CR**	**CH**
Course Name:	**Rapid prototyping and development**	**0**	**0**	**0**	**3**	**3**	**6**

Course Objectives:

- The course is tailored to provide a holistic overview of the rapid prototyping process.
- The course will outline the tooling and product modelling process in detail.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of the rapid prototyping process.
- **CO2** – Students will learn the significance of tooling and product modelling.

Syllabus:

- Introduction, Overview and Basics: Free form or generative manufacturing processes (Rapid Prototyping). Working Principles of Rapid Prototyping Machines. Types of Rapid Prototyping machines with technology employed. Applications of generative manufacturing processes (RP), including bio-medical applications.
- Rapid Tooling (RT): Soft tooling, Vacuum casting, Room temperature vulcanization (RTV). Input devices, Contact and non-contact digitizers such as coordinate measuring machines, Laser and White light scanners. Product Modeling using CAD software and Rapid Prototyping machine vs lead time in product development. Production using Rapid Tooling approach. Overview of applications in Design, Jewelry, Coin, Tableware, Biomedical etc.

Textbooks:

- Ghosh A. *Rapid Prototyping-A Brief Introduction* (East-West Press, 1997)
- Bennett G. *Developments in Rapid Prototyping and Tooling* (Mechanical Engineering Publications 1997)

Reference Books:

- Wang B. *Integrated Product, Process and Enterprise Design* (Chapman and Hall, 1997)
- Edward, *Interactive Computer Graphics* (Addison-Wesley Longman, 1997)
- Bennett G. *Rapid Prototyping and Tooling Research* (Mechanical Engineering Publications 1995)
- Chua C.K., Leong K.F., Lim C.S. Rapid Prototyping: Principles and Applications (World Scientific Publishing Company, 2010)

Approach:

- Studio sessions, and case studies to train students in the aspects of rapid prototyping.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 401	L	T	P	S	CR	CH
Course Name:	Design Management and Entrepreneurship	1	0	0	2	3	5

Course Objectives:

- The course will outline the basic concepts of entrepreneurship and management to design students.
- The course will guide students in developing ideas into commercially viable ventures.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of design management and Entrepreneurship.
- **CO2 –** Students will learn the process of converting ideas into ventures.

Syllabus:

- Product management: overview of organization, structure, principles, and functioning. Design strategy formulation. Introduction to marketing and consumer behaviour. Design as a strategic tool in the corporate sector.
- Case studies in event, brand, and advertisement management. Interactive role of design including administration. Overview of labour and value addition.
- Role of Entrepreneurs and Managers in Value Creation. Decision-making, Resource Information and Management. Team building, interpersonal relationship, and conflict resolution. Design documentation and management of processes.
- Professional practice, contracts, fees, negotiations, ethics and public relations, project planning, IPR issues in Design. An overview of evolution of organizations, industries, and sectors, for profit and non-profit.

Textbooks:

- Oakley M. *Design Management: A Handbook of Issues and Methods* (Blackwell, 1990).
- Desai V. *Dynamics of Entrepreneurial Development and Management* (Himalaya Publishing House, 2001)
- Harrison T. *Product Managers Handbook* (Wheeler Publications, 1994)

Reference Books:

- Drucker P. F. *The Practice of Management* (Harper Collins, 2006)
- Ries E. *The Lean Startup* (Portfolio Penguin, 2011)
- Bajpai V. *Build from scratch (*Jaico books, 2013)
- Isaacson W. *Steve Jobs* (Simon and Schuster, 2011)

Approach:

- Lecture, Studio sessions, and case studies to train students in the aspects of Design Management and Entrepreneurship.

Evaluation Criteria:

- Students will be evaluated based on their performance in assignments (group /individual), final presentation outcomes (e.g., problem areas, the scope of improvements, design research methods implemented, design concepts, report, and presentation) sessional tests, mid / end-semester examination and presentations/report.

Course Number:	DDBD 402	L	T	P	S	CR	CH
Course Name:	UX of Emerging Technologies	2	0	0	2	4	6

Course Objective:

- The objective of the course is to teach undergraduate design students about various modes of interactions with emerging technologies.

Course Outcomes/Learnings

By the end of this course, students will:

- **CO1 –** Understand various modes of interactions with emerging technologies.
- **CO2 –** apply their learnings in their academic/industrial interaction design projects.

Syllabus:

- ***Introduction to emerging technologies:*** Augmented reality (AR), Mixed Reality (MR), Virtual reality (VR), and Extended reality (XR), Tangible User Interfaces (TUI).
- ***Augmented reality (AR):*** Introduction to Technologies that Support Augmented Reality, Overview of Augmented Reality Development Environments, Overview of Interface Design and Evaluation of Augmented Reality Applications.
- ***Virtual reality (VR):*** History of VR, Various Realities, Immersion, Presence, and Reality Trade-Offs, Design Guidelines, Overview of Perception, Adverse health effects, Content creation, Interaction.
- ***Tangible User Interfaces (TUI):*** Origins of Tangible User Interfaces, Application Domains, Frameworks and Taxonomies, Conceptual Foundations, Implementation Technologies, Design and Evaluation Methods, Strengths and Limitations of Tangible User Interfaces, Tangible AR.
- ***Other emerging technologies***: Generative Design, Artificial intelligence (AI) etc. and their applications in Design.

Textbooks:

- Haller, Michael, Mark Billinghurst, and Bruce Thomas, eds. Emerging technologies of augmented reality: Interfaces and design: Interfaces and design. Igi Global, 2006.
- Jerald, Jason. The VR book: Human-centered design for virtual reality. Morgan & Claypool, 2015.
- Shaer, Orit, and Eva Hornecker. "Tangible user interfaces: past, present, and future directions." Foundations and Trends® in Human–Computer Interaction 3.1–2 (2010): 4-137.

Approach:

- Class lectures
- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through sessional test, mid-term and end-term examinations

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 403	L	T	P	S	CR	CH
Course Name:	Design Project - III	0	0	0	8	8	16

Course Objective:

- The objective of the course is to mentor students through the process of design to find solutions to simple problems.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** identify problems in their surroundings and find creative design solutions for them.
- **CO2 –** prototype their design concepts physically and/or digitally.
- **CO3 –** plan and execute a design project.

Syllabus:

Collaborative design project would allow for students to work as a group simulating a professional set---up trying to solve system level design issues, assuming different roles and responsibilities.

- Students will be guided through following stages:
- Group enquiry, ideation and brainstorming.
- Creating project spaces and environments to facilitate innovation
- Iterative designing with user feedback
- Soft Prototyping the idea/concept
- Documentation, report making and presentations.

Approach:

- Students will be supervised and guided by their design mentors.
- Students will conduct their field studies and research work during the allotted time slot of the course.

Evaluation Criteria:

- A continuous evaluation of the student will be done by the design mentor based on his/her performance throughout the project.
- A monthly evaluation of the students by the panel of design mentors.
- The end-semester evaluation will be based on presentation and report submission.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	**DDBD 404**	**L**	**T**	**P**	**S**	**CR**	**CH**
Course Name:	**Summer Design Internship**	**0**	**0**	**0**	**0**	**2**	**0**

Course Objectives:

- To achieve excellence in students' areas of interest through professional projects.
- Students can choose domains relevant to the design department (product, visual and interaction) and carry out their internship by selecting an organization or, research institute or NGO.

Course Outcomes/Learnings

- **CO1 –** Students will be exposed to an industrial environment and learn current technological developments in their domain of interest.
- **CO2** – Students will submit a report and give a presentation on their internship work.

Syllabus:

- Identification of Project area based on the domain of interest and setting up of objectives in consultation with the industries, research organizations and NGOs. Delivering the objectives. Submission of report/Presentation.

Approach:

- Training for 6 - 8 weeks in relevant industries, research organizations and NGOs.

Evaluation Criteria:

- Students will be evaluated based on their final presentation and report.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD405	L	T	P	S	CR	CH
Course Name:	Educational Game Design	0	0	0	3	3	6

Course Objectives:

- The objective of the course is to teach undergraduate design students the fundamentals of educational game design.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Design and develop educational games.

Syllabus:

- Introduction to Game Design, Role of Game Designer, Educational Game Designer, Definition of Game.
- Pedagogy and Games, The Game Core, Educational Impact on Game Design and Use, Importance of Prototypes,
- Game Space, Game Objects, Game Rules, Game Mechanics,
- Understanding Players, Player Taxonomies, Player Personas, Players' Learning Styles.
- Gameplay, Story, Learning, Game Worlds, Narratives, Designing Characters.
- Game Interfaces.
- Game Aesthetics.
- Testing and Feedback, Documenting and Communicating.
- Research methodologies for game interactions, Game metrics & Game telemetry.

Textbooks:

- Kalmpourtzis, George. Educational Game Design Fundamentals: A journey to creating intrinsically motivating learning experiences. CRC Press, 2018.
- Tekinbas, Katie Salen, and Eric Zimmerman. Rules of play: Game design fundamentals. MIT press, 2003.

Reference Books:

- Rouse III, Richard. Game Design: Theory and Practice. Jones & Bartlett Learning, 2004.
- Lankoski, Petri, and Jussi Holopainen. Game design research. ETC Press Pittsburgh, PA, 2017.
- Adams, Ernest. Fundamentals of game design. Pearson Education, 2014.
- Fields, T. V. (2013). Game industry metrics terminology and analytics case study. In Game Analytics: Maximizing the Value of Player Data (pp. 53-71). London: Springer London.

- Drachen, A. (2015). Behavioral Telemetry in Games User Research. In R. Bernhaupt (Ed.), Game User Experience Evaluation (pp. 135-165). Springer. https://doi.org/10.1007/978-3-319-15985-0_7

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content..
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 406	L	T	P	S	CR	CH
Course Name:	Universal Design	0	0	0	3	3	6

Course Objectives:

- This course will teach the foundation and rationale for the universal design paradigm.
- This course will summarize universal design practices across public accommodations, transportation, housing, health, and wellness.

Course Outcomes/Learnings

- **CO1 –** Students will gain a comprehensive understanding of the universal design paradigm.
- **CO2** – Students will learn and apply universal design aspects across various activities.
- **CO3 -** Students will present their ideas, concepts and prototypes through presentation and a comprehensive report.

Syllabus:

- Introduction to Universal Design: Origins, emergence, goals, barriers in universal experience. Modernism and the Modernist Style. Demographics in universal design: Uses and beneficiaries. Universal Design as Innovation, Introducing Universal Design to Practice. Design for human performance.
- Design For Health and Wellness: Injury and disease protection, and guidelines. Design for Social Participation: Social Construction Theory, Segregation and Clustering, and Participation. Public Accommodations: The Purpose of Accessible Design, Universal Design Strategies, and Future Challenges. Evolution of Accessible Housing Policy, Public Transportation and Universal Design.

Textbooks:

- Steinfeld E. and Maisel J. *Universal Design – Design Inclusive Environments* (John Wiley and Sons, 2012)
- Lidwell W. Holden K. and Butler J. *Universal Principles of Design* (Rockport Publishers ,2003)

Reference Books:

- Martin B, Hanington B. *Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions* (Rockport Publishers, 2012)
- Seidle J. H. *Barrier-Free Design: A manual for building designers and managers* (Routledge, 2016)

Approach:

- Studio sessions, and case studies to train students in the aspects of universal design.

Evaluation Criteria:

- Understanding of the course content..
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

Course Number:	DDBD 407	L	T	P	S	CR	CH
Course Name:	Design Project - IV	0	0	0	12	12	24

Course Objective:

- The objective of the course is to enable students to effectively apply design methodologies and user-centered research to develop innovative and practical solutions in the fields of Visual Communication, Product Design, or Interaction Design.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** conduct user research to identify design problems and opportunities.
- **CO2 –** to apply their knowledge of Design Methods.
- **CO3 –** create and present a conceptual model and brief report of their designed solution.

Syllabus:

The students can select a project under a Visual Communication, Product Design or Interaction Design faculty. A context or broad area will be assigned for conducting appropriate user research and identifying problems or opportunity for design intervention. The students will be expected to integrate their knowledge of Design Methods, Ergonomics, User Research and Prototyping skills to come up with appropriate solutions. The deliverable will be an appropriate working model describing the designed solution and a detailed report.

The deliverable will be an appropriate conceptual model describing the designed solution and a brief report.

Approach:

- Students will be supervised and guided by their design mentors.
- Students will conduct their field studies and research work during the allotted time slot of the course.

Evaluation Criteria:

- A continuous evaluation of the student will be done by the design mentor based on his/her performance throughout the project.
- A monthly evaluation of the students by the panel of design mentors.
- The end-semester evaluation will be based on presentation and report submission.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 408	L	T	P	S	CR	CH
Course Name:	Nature Inspired Design	0	0	0	3	3	6

Course Objectives:

- The course will introduce the fundamentals of biomimicry and outline about creating design solutions from nature.
- The course will outline integrating nature-inspired design principles with various disciplines to create innovative, sustainable, and efficient solutions.

Course Outcomes/Learnings

- **CO1 –** Students will understand the nature-inspired design process.
- **CO2** – Students will learn the significance of designing products inspired by nature and their adaptation mechanisms.
- **CO3 –** Students will present their ideas, concepts and prototypes through presentation and a comprehensive report.

Syllabus:

- Introduction to Biomimicry, Nature's unifying patterns, Paradigm in Nature about Biomimicry, shape memory and ecological design thinking
- Case study on available nature inspired products and services, Skills, attitudes and mindset for a biomimic, Design-Nature Relationship, Function and Strategy,
- Abstract design strategies from nature, emulate nature's strategies in solution, adaptation mechanisms, evaluate feasibility, Using the UNSDG to identify challenges, Taking your biomimicry ideas to market.

Textbooks:

- Macnab M. *Design by Nature: Using Universal Forms and Principles in Design* (New Riders, 2011)
- Benyus J. M. *Biomimicry: innovation inspired by nature* (Harper Collins, 2002)

References:

- Powers A. *Nature in Design: The Shapes, Colors and Forms that Have Inspired Visual Invention* (Conran Octopus, 2002)
- Finsterwalder R. *Form Follows Nature: A History of Nature as Model for Design in Engineering Architecture and Art* (Springer, 2011)
- Clendenan M. and Woolcock K. R. *Design Like Nature: Biomimicry for a Healthy Planet* (Orca Book Publishers, 2021)

Approach:

- Studio sessions, and case studies to train students in the aspects of nature inspired design process.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.

L: Lecture, T: Tutorial, P: Laboratory, S: Studio, CH: Contact Hours, CR: Credit

Course Number:	DDBD 409	L	T	P	S	CR	CH
Course Name:	Automotive Styling	0	0	0	3	3	6

Course Objectives:

- The objective of the course is to teach undergraduate design students the fundamentals of transportation design process.

Course Outcomes/Learnings

By the end of this course, students will be able to:

- **CO1 –** Understand different types of vehicles, their construction and Architecture.
- **CO2 –** apply their learnings in transportation design projects.

Syllabus:

- A brief history of automobiles; from Coach building to Mass Production.
- Vehicle Types, Configurations. Vehicle Construction and Architecture, Trends and Developments.
- Vehicle Design process, Concept to Realization.
- Vehicle Ergonomics and Packaging.
- Styling/ Vehicle Form, Vehicle Aerodynamics and Form, Brand Styles and Values, Styling Trends.
- Concept Sketching and Presentation Skills, CAD Skills, Modelling skills.

Textbooks:

- Haajanen, L. W. & Nydén, B., Illustrated Dictionary of Automobile Body Styles, Mcfarland & Co., Jefferson, N.C., 2002.
- Lamm, M. & Holls, D. A Century Of Automotive Style: 100 Years Of American Car Design, Lamm---Morada Pub. Co., Stockton, Calif.,1996.
- Lewin Tony, Broff, Ryan, How To Design Cars Like A Pro, Mbi Publishing Company, MN, USA, 2003.
- Norbye, J. P., Car Design: Structure & Architecture, Tab Books, Blue Ridge Summit, PA, 1984.
- Sparke, P., A Century Of Car Design, Mitchell Beasley, London, 2002.

Approach:

- Studio sessions for short individual assignments, group assignments, and/or project work.

Evaluation Criteria:

- Understanding of the course content.
- Active participation in class discussions.
- Performance in individual assignments.
- Final submission of classwork and project assignments.
- Evaluation through mid-term and end-term presentations.