



VIT[®]

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

**VIT SCHOOL OF DESIGN
(V-SIGN)**

**Bachelor of Design
(Industrial Design)**
(B.Des Industrial Design)

Curriculum
(2019-2020 admitted students)



VISION STATEMENT OF VELLORE INSTITUTE OF TECHNOLOGY

Transforming life through excellence in education and research.

MISSION STATEMENT OF VELLORE INSTITUTE OF TECHNOLOGY

World class Education: Excellence in education, grounded in ethics and critical thinking, for improvement of life.

Cutting edge Research: An innovation ecosystem to extend knowledge and solve critical problems.

Impactful People: Happy, accountable, caring and effective workforce and students.

Rewarding Co-creations: Active collaboration with national & international industries & universities for productivity and economic development.

Service to Society: Service to the region and world through knowledge and compassion.

VISION STATEMENT OF VIT SCHOOL OF DESIGN (V-SIGN)

To be a world renowned school for producing creative professionals in the field of Art, Design, Multimedia, and Animation.

MISSION STATEMENT OF VIT SCHOOL OF DESIGN (V-SIGN)

- To nurture industry-ready designers through holistic training in the field of Art, Design, Multimedia and Animation.
- To innovate newer methods of problem solving in the field of design using state-of-the-art research facilities.
- To produce confident & skilled professionals, trend-setters and leaders in the field of design.



B. Des Industrial Design

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. Graduates will be able to independently carryout complete Industrial Design considering aesthetics, ergonomics, etc.,
2. Graduates will be able to work in multicultural cross discipline teams effectively.
3. Graduates will be able to communicate the design and other technical aspects effectively using various tools.



B. Des Industrial Design

PROGRAMME OUTCOMES (POs)

PO_01: Having an ability to apply knowledge of mathematics, science, and engineering

PO_02: Having a clear understanding of the subject related concepts and of contemporary issue

PO_03: Having ability to design a component or a product applying all the relevant standards and with realistic constraints, including public health, safety, culture, society and environment.

PO_04: An ability to design and conduct experiments, as well as to analyse and interpret data.

PO_05: Having problem-solving ability solving social issues through design.

PO_06: Having a clear understanding of professional and ethical responsibility

PO_07: Having cross-cultural competency exhibited by working in teams.

PO_08: Inculcating curiosity for lifelong learning about design.

PO_09: Having Sense-Making Skills of creating unique insights in what is being seen or observed (Higher level thinking skills).

PO_10: Having creativity and design thinking capability

PO_11: Having a good cognitive load management skills related to project management and finance

PO_12: Having virtual expression and digital foot printing ability



B. Des Industrial Design

CREDIT STRUCTURE

Category-wise Credit distribution

Category	Credits
University core (UC)	63
Programme core (PC)	45
Programme elective (PE)	60
University elective (UE)	12
Bridge course (BC)	-
Total credits	180



B. Des Industrial Design

DETAILED CURRICULUM

University Core

S. No.	Course Code	Course Title	L	T	P	J	C
1.	MEE1001	Engineering Drawing	1	0	4	0	3
2.	CSE1001	Problem Solving and Programming	0	0	6	0	3
3.	CHY1002	Environmental Sciences	3	0	0	0	3
4.	MAT1002	Mathematics for Designers	2	0	0	4	3
5.	PHY1004	Physics for Designers	2	0	0	4	3
6.	CHY1006	Chemistry for Designers	2	0	0	4	3
7.	ENG1000/ ENG2000	Foundation English I Foundation English II	0	0	4	0	2
8.	ENG1901/ ENG1902/ ENG1903	Technical English I Technical English II Advanced Technical English	0 0 0	0 0 0	4 4 2	0 0 4	2
9.	HUM1021	Ethics and Values	2	0	0	0	2
10.	MGT1022	Lean Startup Management	1	0	0	4	2
11.	MEE1025	Design Workshop	0	0	4	4	3
12.	BDE1032	Summer Project on Social Concern	0	0	0	0	3
13.	FLC4097	Foreign Language (basket)	0	0	0	0	2
14.	EXC4097	Personality Development (Co/Extra-curricular Activity)	0	0	0	0	2
15.	BDE3099	Industry Internship (Summer)	0	0	0	0	3
16.	STS4097	Soft Skills	0	0	0	0	6
17.	BDE4099	Capstone Project	0	0	0	0	20



B. Des Industrial Design

Programme Core

S. No.	Course Code	Course Title	L	T	P	J	C
1.	BDE1001	Design Fundamentals – 2D	0	0	4	4	3
2.	BDE1002	Image Representation Techniques	0	0	4	4	3
3.	BDE1003	Design Studio – Problem Identification	0	0	4	4	3
4.	BDE1004	Fundamentals of Ergonomics	2	0	2	0	3
5.	BDE1005	Electronics for Industrial Design	2	0	2	0	3
6.	BDE1006	Design History	1	2	0	4	3
7.	BDE1007	Design and Society	1	2	0	4	3
8.	BDE1008	Form Studies	0	0	4	4	3
9.	BDE1009	Product Design	0	0	4	4	3
10.	BDE1011	Materials and Processes – Metals	2	0	0	4	3
11.	BDE1013	Materials and Processes - Non-metals	2	0	0	4	3
12.	BDE2001	Advanced Image Representation Techniques	0	0	4	4	3
13.	BDE2002	Design Fundamentals – 3D	0	0	4	4	3
14.	BDE2003	Design Studio – Problem Analysis	0	0	4	4	3
15.	BDE3002	Smart Product Design	0	0	4	4	3



B. Des Industrial Design

Programme Elective

S. No.	Course Code	Course Title	L	T	P	J	C
1.	BDE1010	Computer Modelling and Simulation Techniques	0	0	4	4	3
2.	BDE1012	Graphic Design	0	0	4	4	3
3.	BDE1014	Creative Explorations Techniques	0	0	4	4	3
4.	BDE1015	Product Detailing and Mechanisms	2	0	0	4	3
5.	BDE1016	Collaborative Design Project	0	0	0	12	3
6.	BDE1017	Redesign Project	0	0	0	8	2
7.	BDE1018	Pottery	0	0	4	4	3
8.	BDE1019	Carpentry	0	0	4	4	3
9.	BDE1020	Design Thinking	1	2	0	4	3
10.	BDE1021	Typography	0	0	4	4	3
11.	BDE1022	Packaging Design	0	0	4	4	3
12.	BDE1023	Product Semiotics	2	2	0	0	3
13.	BDE1024	Origami	0	0	4	4	3
14.	BDE1025	User Experience Design	0	0	4	4	3
15.	BDE1026	Indian Symbology	2	2	0	0	3
16.	BDE1027	Interaction Design	0	0	4	4	3
17.	BDE1028	Service Design	0	0	4	4	3
18.	BDE1029	Game Design	0	0	4	4	3
19.	BDE1030	System Design Project	0	0	4	4	3
20.	BDE1031	Exhibition Design	0	0	4	4	3
21.	BDE2004	Applied Ergonomics	2	0	2	0	3
22.	BDE3001	Electronic Product Design	0	0	4	4	3



23.	BDE3003	Advanced Form Studies	0	0	4	4	3
24.	BDE3004	New Product Development	1	2	0	4	3
25.	BDE3005	Sustainable Product Design	0	0	4	4	3
26.	BDE3006	Toy Design	0	0	4	4	3
27.	BDE3007	Medical Product Design	0	0	4	4	3
28.	BDE3008	Bio Inspired Product Design	1	2	0	4	3
29.	BDE3009	Mobility Design	0	0	4	4	3
30.	BDE4001	Advanced Smart Product Design	0	0	4	4	3
31.	BDE4002	Advanced Computer Modelling and Simulation Techniques	0	0	4	4	3
32.	MGT1054	Product Planning and Strategy	2	2	0	0	3
33.	MGT1055	Design Management	2	2	0	0	3

University Electives

(From the respective baskets)

Sl.No	Course Title	Credits
1	University Elective - I	3
2	University Elective - II	3
3	University Elective - III	3
4	University Elective - IV	3



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**SYLLABUS FOR
UNIVERSITY CORE
COURSES**



Course code	ENGINEERING DRAWING	L	T	P	J	C
MEE1001		1	0	4	0	3
Pre-requisite		Syllabus version				
		2.0				
Course Objectives:						
<ol style="list-style-type: none"> 1. Understand and escalate the importance of basic concepts and principles of Engineering Drawing (components, sections, views, and graphical representation). 2. Enable the students with various concepts like dimensioning, conventions and standards related to working drawings in order to become professionally efficient. 3. Develop the ability to communicate with others through the language of technical drawing and sketching. 4. Ability to read and interpret engineering drawings created by others. 5. Ability to draw orthographic projections and sections. 6. Develop an understanding for size specification procedures and use of SI and traditional units of linear measure. 						
Expected Course Outcome:						
<p>Upon successful completion of the course the students will be able to</p> <ol style="list-style-type: none"> 1. Apply BIS and ISO Standards in Engineering Drafting. 2. Graphically construct mathematical curves in engineering applications. 3. Visualize geometrical solids in 3D space through Orthographic Projections 4. Construct isometric scale, isometric projections and views. 5. Draw sections of solids including cylinders, cones, prisms and pyramids. 6. Draw projections of lines, planes, solids, isometric projections and sections of solids including cylinders, cones, prisms and pyramids using Mini-Dafter and CAD. 7. Construct orthographic projections from pictorial views. 						
Module:1	Lettering and Dimensioning	1 hours				
Introduction, lettering practice, Elements of dimensioning - systems of dimensioning.						
Module:2	Geometric Constructions	2 hours				
Free hand sketching, Conic sections, Special curves.						
Module:3	Projection of Points and Projection of Lines	2 hours				
Projection of Points: First and Third Angle Projections; Projection of points. Projection of Lines: Projection of straight lines (First angle projection only); Projection of lines inclined to one plane and both planes, true length and true inclinations.						
Module:4	Projection of Solids and Section of Solids	3 hours				
Projection of solids: Classification of solids, Projection of solids in simple position, Projection of solids inclined to one plane. Sections of Solids: Right regular solids and auxiliary views for the true shape of the sections.						
Module:5	Development of Surfaces	2 hours				
Development of surfaces for various regular solids.						
Module:6	Isometric Projection and Perspective Projection	2 hours				
Isometric Projection: Isometric scales, Isometric projections of simple and combination of solids; Perspective Projection: Orthographic representation of a perspective views – Plane figures and simple solids - Visual ray method.						



Module:7	Orthographic Projection	2 hours	
Module content			
Module:8	Contemporary issues:	1 hours	
	Total Lecture hours:	15 hours	
Text Book(s)			
1.	Venugopal K and Prabhu Raja V, "Engineering Graphics", New AGE International Publishers, 2015.		
Reference Books			
1.	N. D. Bhatt, Engineering Drawing, Charotar publishing House, 2012.		
2.	Natarajan, K. V., A Text book of Engineering Graphics, Dhanalakshmi Publishers, 2012.		
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar			
List of Challenging Experiments (Indicative)			
1.	Identifying the incorrect dimensioning and correct it as per BIS standards for Engineering Components.		4 hours
2.	Tutorials on free hand sketching of the plan view of stadium, garden, etc.,		4 hours
3.	Tutorials on geometric constructions like conics and special curves for projection of cricket ball, missile projection, etc.,		4 hours
4.	Representation of orthographic projection of points		4 hours
5.	Representation of orthographic projection of lines (First angle projection only) inclined to one plane and projection of lines inclined to both the planes- solving problems like electrical bulbs hanging from the roof, finding the shortest distance between fan to electrical switch board, etc.,		8 hours
6.	Sketching orthographic projection of solids in simple position and projection of solids inclined to one plane for household accessories and objects.		8 hours
7.	Drawing the auxiliary views, orthographic views and true shape of sectioned regular solids for household accessories and objects.		4 hours
8.	Development of lateral surfaces of the regular shapes and sectioned shapes for water cans, refrigerator, cylinder container, funnel, etc.,		4 hours
9.	Conversion of orthographic views to isometric views for engineering components.		8 hours
10.	Tutorial problems on perspective projection of plane figures and simple solids for train with track, landscape, etc.,		4 hours
11.	Conversion of pictorial drawing into orthographic projection for engineering components, architectural structures, etc.,		8 hours
Total Laboratory Hours			60 hours
Mode of assessment:			
Recommended by Board of Studies		03-03-2018	
Approved by Academic Council		No. 49	Date 15-03-2018



Course code	PROBLEM SOLVING AND PROGRAMMING	L	T	P	J	C
CSE1001		0	0	6	0	3
Pre-requisite		Syllabus version				
		1.0				
Course Objectives:						
<ol style="list-style-type: none"> 1. To develop broad understanding of computers, programming languages and their generations 2. Introduce the essential skills for a logical thinking for problem solving 3. To gain expertise in essential skills in programming for problem solving using computer 						
Expected Course Outcome:						
<ol style="list-style-type: none"> 1. Understand the working principle of a computer and identify the purpose of a computer programming language 2. Learn various problem solving approaches and ability to identify an appropriate approach to solve the problem 3. Differentiate the programming Language constructs appropriately to solve any problem 4. Solve various engineering problems using different data structures 5. Able to modulate the given problem using structural approach of programming 6. Efficiently handle data using at les to process and store data for the given problem 						
Text Book(s)						
1.	John V. Guttag., 2016. Introduction to computation and programming using python: with applications to understanding data. PHI Publisher.					
Reference Books						
1.	Charles Severance.2016.Python for everybody: exploring data in Python 3, Charles Severance.					
2	Charles Dierbach.2013.Introduction to computer science using python: a computational problem-solving focus. Wiley Publishers.Mode of Evaluation: PAT / CAT/ FAT					
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar						
List of Challenging Experiments (Indicative)						
1.	Steps in Problem Solving Drawing Flowchart using yEd tool/Raptor Tool	4 hours				
2.	Introduction to Python, Demo on IDE, Keywords, Identifiers, I/O Statements, Simple Program to display Hello world in Python.	4 hours				
3.	Operators and Expressions in Python	4 hours				
4.	Algorithmic Approach 1: Sequential	2 hours				
5.	Algorithmic Approach 2: Selection (if, elif, if.. else, nested if else	2 hours				
6.	Algorithmic Approach 3: Iteration (while and for)	4 hours				
7.	Strings and its Operations	2 hours				
8.	Regular Expressions	2 hours				
9.	List and its operations.	2 hours				
10.	Dictionaries: operations	2 hours				
11.	Tuples and its operations	2 hours				
12.	Set and its operations	2 hours				
13.	Functions, Recursions	2 hours				
14.	Sorting Techniques (Bubble/Selection/Insertion)	4 hours				
15.	Searching Techniques : Sequential Search and Binary Search	3 hours				
16.	Files and its Operations	4 hours				
Total Laboratory hours						45 hours
Mode of assessment:						
Recommended by Board of Studies		04-04-2014				
Approved by Academic Council		No. 38	Date	23-10-2015		



CHY1002	Environmental Sciences	L	T	P	J	C
		3	0	0	0	3
Pre-requisite		Syllabus version				
		1.1				
Course Objectives:						
<ol style="list-style-type: none"> 1. To make students understand and appreciate the unity of life in all its forms, the implications of life style on the environment. 2. To understand the various causes for environmental degradation. 3. To understand individuals contribution in the environmental pollution. 4. To understand the impact of pollution at the global level and also in the local environment. 						
Expected Course Outcome: Students will be able to						
<ol style="list-style-type: none"> 1. Recognize the environmental issues in a problem oriented interdisciplinary perspective 2. Understand the key environmental issues, the science behind those problems and potential solutions. 3. Demonstrate the significance of biodiversity and its preservation 4. Identify various environmental hazards 5. Design various methods for the conservation of resources 6. Formulate action plans for sustainable alternatives that incorporate science, humanity, and social aspects 7. Have knowledge enabling them to make sound life decisions as well as enter a career in an environmental profession or higher education. 						
Module:1	Environment and Ecosystem	7 hours				
Key environmental problems, their basic causes and sustainable solutions. IPAT equation. Ecosystem, earth – life support system and ecosystem components; Food chain, food web, Energy flow in ecosystem; Ecological succession- stages involved, Primary and secondary succession, Hydrarch, mesarch, xerarch; Nutrient, water, carbon, nitrogen, cycles; Effect of human activities on these cycles.						
Module:2	Biodiversity	6 hours				
Importance, types, mega-biodiversity; Species interaction - Extinct, endemic, endangered and rare species; Hot-spots; GM crops- Advantages and disadvantages; Terrestrial biodiversity and Aquatic biodiversity – Significance, Threats due to natural and anthropogenic activities and Conservation methods.						
Module:3	Sustaining Natural Resources and Environmental Quality	7 hours				
Environmental hazards – causes and solutions. Biological hazards – AIDS, Malaria, Chemical hazards- BPA, PCB, Phthalates, Mercury, Nuclear hazards- Risk and evaluation of hazards. Water footprint; virtual water, blue revolution. Water quality management and its conservation. Solid and hazardous waste – types and waste management methods.						
Module:4	Energy Resources	6 hours				



Renewable - Non renewable energy resources- Advantages and disadvantages - oil, Natural gas, Coal, Nuclear energy. Energy efficiency and renewable energy. Solar energy, Hydroelectric power, Ocean thermal energy, Wind and geothermal energy. Energy from biomass, solar- Hydrogen revolution.			
Module:5	Environmental Impact Assessment	6 hours	
Introduction to environmental impact analysis. EIA guidelines, Notification of Government of India (Environmental Protection Act – Air, water, forest and wild life). Impact assessment methodologies. Public awareness. Environmental priorities in India.			
Module:6	Human Population Change and Environment	6 hours	
Urban environmental problems; Consumerism and waste products; Promotion of economic development – Impact of population age structure – Women and child welfare, Women empowerment. Sustaining human societies: Economics, environment, policies and education.			
Module:7	Global Climatic Change and Mitigation	5 hours	
Climate disruption, Green house effect, Ozone layer depletion and Acid rain. Kyoto protocol, Carbon credits, Carbon sequestration methods and Montreal Protocol. Role of Information technology in environment-Case Studies.			
Module:8	Contemporary issues	2 hours	
Lecture by Industry Experts			
Total Lecture hours:			45 hours
Text Books			
1.	G. Tyler Miller and Scott E. Spoolman (2016), Environmental Science, 15 th Edition, Cengage learning.		
2.	George Tyler Miller, Jr. and Scott Spoolman (2012), Living in the Environment – Principles, Connections and Solutions, 17 th Edition, Brooks/Cole, USA.		
Reference Books			
1.	David M.Hassenzahl, Mary Catherine Hager, Linda R.Berg (2011), Visualizing Environmental Science, 4thEdition, John Wiley & Sons, USA.		
Mode of evaluation: Internal Assessment (CAT, Quizzes, Digital Assignments) & FAT			
Recommended by Board of Studies		12.08.2017	
Approved by Academic Council		No. 46	Date 24.08.2017



Course code	MATHEMATICS FOR DESIGNERS				L	T	P	J	C
MAT1002					3	0	0	0	3
Pre-requisite					Syllabus version				
					1.0				
Course Objectives:									
The aim of this course is to provide a solid foundation of mathematics in Industrial Design									
Expected Course Outcome:									
At the end of the course the student should be able to									
[1] Understand matrices, its properties and applications									
[2] Understand basic trigonometric expansions and its applications									
[3] Apply differential calculus for finding extrema and curve-tracing, and solve differential equations									
[4] Apply integration methods for measuring areas and volumes									
[5] Learn how to use analytical geometry in design									
[6] Understand fractals, Fibonacci series, Golden ratio and their applications in pattern making.									
Module:1	Matrices in Design				7 hours				
Introduction to Matrices from Designer's perspective –Symmetric matrices and determinants –Elementary transformations - Solution of a system of linear equations by inversion method– Rank of a matrix – Eigen values and eigen vectors of matrices – Basics of MATLAB									
Module:2	Trigonometry				6 hours				
Trigonometric ratios - de Moivre's theorem- Expansion of $\sin n\theta$, $\cos n\theta$ and $\tan n\theta$ - Hyperbolic and inverse hyperbolic functions - Applications to heights and distances									
Module:3	Differential Calculus				7 hours				
Derivative and its physical interpretation – Rules of differentiation - Higher order derivatives – Local maxima and minima – Concavity and points of inflection – Elementary concepts of curve tracing - Elementary applications to rate flow problems - MATLAB Tutorial									
Module:4	Differential Equations				6 hours				
Formation and solution of differential equations: variable separable, exact and linear equations - Solution of second order homogenous differential equations with constant coefficients – Applications to electrical and mechanical circuits									
Module:5	Integral Calculus				6 hours				
Definite integral and its properties – Applications to averages, areas between plane curves, volumes of solids and solids of revolution - MATLAB Tutorial									
Module:6	Analytic Geometry				7 hours				
Direction cosines and direction ratios - Plane, straight line and sphere and their vector representation - Shortest distance between two skew lines – Surfaces by spherical and cylindrical polar coordinates – Basic shapes of solids									
Module:7	Proportions and Fractals				4 hours				
Golden proportions and construction of Golden spiral – Basic concepts of Fractals									



Module:8	Expert Lecture on Mathematics for Designers	2 hours		
	Total Lecture hours:	45 hours		
Text Book(s)				
1.	Advanced Engineering Mathematics , Dennis G Zill, Warren S Wright, 6 th Edition, Jones & Bartlett Learning, (2017)			
2.	Single Variable Calculus: Concepts and Contexts , James Stewart, 4 th Edition, Brooks/Cole, Cengage Learning, (2009)			
3.	Plane Trigonometry , Loney S. L., 14 th Edition, Arihant Publications, (2016)			
4.	Fractals and Chaos - An Illustrated Course , Paul S Addison, CRC Press, (1997)			
Reference Books				
1.	Calculus and Analytic Geometry , George B Thomas, Jr., Ross L. Finney, 9 th Edition, Pearson, (2002)			
2.	Geometry of Design – Studies in proportion and Composition , Kimberly Elam, 2 nd Revised Updated Edition, Princeton Architectural Press, (2011)			
3.	Higher Engineering Mathematics , B.S. Grewal, 44 th Edition, Khanna Publishers, (2018)			
4.	MATLAB Primer , Timothy A. Davis Kermit Sigmon, 7 th Edition, CRC Press, (2005)			
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar				
Mode of assessment:				
Recommended by Board of Studies		03-03-2018		
Approved by Academic Council		No. 49	Date	15-03-2018



Course code	Physics for Designers	L	T	P	J	C
PHY 1004		3	0	0	0	3
Pre-requisite		Syllabus version				
		1.00				
Course Objectives:						
<ol style="list-style-type: none"> 1. To develop understanding of deterministic design. 2. To apply principles of Physics and engineering to an iterative cycle of product design, Laws governing machine elements. 3. Learn to apply and use deterministic design to create machine modules and compare with analytical module. 						
Expected Course Outcome:						
<ol style="list-style-type: none"> 1. Analyze the deterministic design using the physical quantities. 2. Explain acoustic principles in terms of designing aspects. 3. Apply the concepts of thermodynamics and heat transfer techniques. 4. Develop deterministic design using optical image formation principles 5. Apply Electric, electromagnetics and mechanics for deterministic design of automated systems 6. Recall the contemporary issues 						
Module:1	Technical Mechanics:	9 hours				
Introduction of Physics from Designer Perspective. Physical quantities, Scalars and vectors, Vectors in 3-D, Static equilibrium for a particle moment of a force, Equivalent force systems: distributed loads, Equilibrium of rigid bodies and the analysis of trusses, Internal forces, Dry friction, Belts, and centre of gravity, Moment of inertia, Pure bending, Shear stress in beams, Beams with axial loads, Torsion, Stress-element and plane stress, Rectilinear motion, Curvilinear motion Newton's laws.						
Module:2	Acoustics:	6 hours				
Waves in media, Superposition of waves, Standing waves, Sound intensity level, Harmonics and the quality of sound, Production and detection of ultrasonic and infrasonic waves and applications, Doppler Effect. Demonstrations of Acoustics						
Module:3	Thermodynamics:	6 hours				
Changes of state and their description, Molecular heat theory state equation of ideal gases, Major terms of thermodynamics, Laws of thermodynamics, Heat propagation, Entropy, Carnot cycles, Thermodynamics scale of temperature, Basics of Finite time thermodynamics. Demonstrations of Heat Transfer						
Module:4	Optics:	6 hours				
Fermat's Principle, General theory of image formation, Aberration in images, Interference of a light, Fresnel diffraction, Double refraction and optical rotation, Diffraction gratings, Optical instruments- Entrance and exit - pupils.						
Module:5	Solids and structures:	5 hours				
Basic crystallography, Lattice and Basis, Crystal structure, Materials by design, Artificial Structures, Examples. Properties of bonding and factors affecting the bonding between base materials and adhesives specific to metals, polymers, ceramics, wood and leather etc.						
Module:6	Electro Mechanics:	5 hours				
DC circuits, Electric field (capacitors), Magnetic field (induction), Electromagnetics, Single phase alternating current (RLC circuits), Producing 3-phase voltage and its characteristics. Star and delta connection, Basics of electronics, semiconductor devices (diodes, thyristors, transistors, etc.), Example: Robotics integration of electrical and mechanical concepts						
Module:7	Basics of Relativistic Concepts:	6 hours				
Basic concepts of quantum mechanics, Photoelectric effect, Uncertainty relation, Basics of relativistic physics (mass growth, mass-energy relationship). Examples: virtual gaming concepts.						



Module:8	: LECTURE BY INDUSTRY EXPERTS	2 hours	
		Total Lecture hours:	45 hours
Text Book(s)			
<ol style="list-style-type: none"> 1. Basic Physics, Kenneth W Ford, World Scientific, (2017). 2. Basic Physics, Karl F. Kuhn, John Wiley & Sons Inc, (2017). 3. University Physics, Sears and Zemansky, Pearson India, 13th Edition, (2013). 4. Concepts of Modern Physics, Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, McGraw Hill Education; 7th Edition (2017). 5. Fundamentals of Electric Circuits, Alexander and Sadiku, 4th Edition, Mc Graw-Hill, (2009). 			
Reference Books			
<p>Reference Books</p> <ol style="list-style-type: none"> 1. University Physics: Mechanics, Sears and Zemansky's, Pearson India, 12/Edition, (2011). 2. The Physics of Sound, Richard E. Berg & David G. Stork, Pearson, (2011). 3. Heat and Thermodynamics, Mark Zemansky & Richard Dittman, 8th Edition, Mc Graw Hill, (2017). 4. Fundamentals of Optics, Francis Arthur Jenkins, Mc Graw Hill, 4th Edition, (2015). 5. Mechanics of Solids and Structures, David W A Rees, World Scientific, (2000) 7. Fundamentals of Electronic Devices and Circuits, David A. Bell, Oxford University Press; 5th Edition (2009). 8. Introduction to Special Relativity, Robert Resnick, Wiley; 1st Edition (2007). 9. Fundamentals of Special and General Relativity, K.D. Krori, PHI (2010). 			
Mode of Evaluation: Internal Assessment (CAT, FAT and Non-contact hour project)			
Recommended by Board of Studies		03-03-2018	
Approved by Academic Council		No. 49	Date Date: 15-03-2018



Course code	Chemistry for Designer	L	T	P	J	C
CHY1006		3	0	0	0	3
Pre-requisite	Chemistry of 12th standard or equivalent	Syllabus version				
		1.0				
Course Objectives:						
<ul style="list-style-type: none"> • To infuse designing concepts in chemistry • To lay foundation for practical application of chemistry for designers 						
Expected Course Outcome:						
<ul style="list-style-type: none"> • To understand and analyze the importance of modern materials from material perspective and also get to know the structural features of materials which are made out of specific chemical compounds. • Evaluate the causes of metallic corrosion and apply the methods for corrosion protection of Metals • Evaluate the electrochemical energy storage systems such as lithium batteries, fuel cells and solar cells, and design for usage in electrical and electronic applications • Assess the quality of different adhesives used in the manufacturing of materials • Analyze the properties of different colorants and demonstrate their usefulness in the manufacturing of materials useful for designing any specific components which would give aesthetic appearance • To assimilate the importance of contemporary materials from technological advancement side. This offers student to come out with novel materials for day to day use. 						
Module:1	BASICS OF MATERIALS	7 hours				
Introduction to engineering materials – significance of structure property correlations in all selected materials, Unit Cells, Metallic Crystal Structures, Density Computations, Crystal Systems, Crystallographic Points, Crystallographic Directions, Crystallographic Planes, Linear and Planar. Densities, Close-Packed Crystal Structures, Crystalline and Non-crystalline Materials, Single Crystals, Polycrystalline Materials, Imperfection in solids – Point, Line, Surface and Volume defects - Polymorphism and Allotropy						
Module:2	CORROSION AND PREVENTION	7 hours				
Dry and wet corrosion - detrimental effects to buildings, machines, devices & decorative art forms, emphasizing Differential aeration, Pitting, Galvanic and Stress corrosion cracking; Factors that enhance corrosion and choice of parameters to mitigate corrosion. Corrosion protection - cathodic protection – sacrificial anodic and impressed current protection methods						
Module:3	METAL FINISHING-COATING	5 hours				
Importance and methods of metal finishing. Electroplating: Principle, factors and process. Electroplating of Cu, Au and Ni. Electroless plating of Cu, Ni and Nickel on Al. PVD and CVD. Application of coating in making finished materials.						
Module:4	ELECTROCHEMICAL ENERGY SYSTEMS	6 hours				
Brief introduction to conventional primary and secondary batteries; High energy electrochemical energy systems: Lithium batteries – Primary and secondary, its Chemistry, advantages and applications. Solar cells – Types – Importance of silicon single crystal, polycrystalline and amorphous silicon solar cells, dye sensitized solar cells - working principles, characteristics and application in the area of sustainable energy creation.						
Module:5	BASICS OF POLYMER AND ADHESIVES – BONDING TECHNOLOGY	7 hours				
Difference between thermoplastics and thermosetting plastics; Engineering application of plastics - ABS, PVC, PTFE and Bakelite; Conducting polymers- Polyacetylene- Mechanism of conduction – applications Classification: Thermosetting and thermoplastic synthetic resins; adhesive action; bonding process: adherends assembly of adhesive coated adherends and conditioning after bonding, development of adhesive strength. Physical and chemical factors influencing adhesive action						
Module:6	BASICS OF COLOURANTS	6hours				
Chromatic and achromatic colors. Red shift, blue shift, hyperchromic effect, solvatochromism, halochromism,.Beer-Lambert's law, absorptivity, - empirical correlations between the chemical structures and their color. Chromophores, auxochromes, distribution rules, chromogens. $n \rightarrow \pi^*$, donor-acceptor molecules. Color and constitution of simple azo dyes. Steric effects, and azo hydrazone tautomerism in azo dyes. Color and						



chemical constitution of indigoid dyes. Introduction to cross - conjugated chromophores.			
Module:7	CONTEMPORARY MATERIALS	5 hours	
Ceramics: alumina, zirconia, composites: ceramic matrix, polymer, for bio and machine parts, smart materials – photochromic, color changing materials, LEDs. Materials for energy and environment: solar cells, automobile exhaust catalysts, concepts of nanotechnology applied to materials; few examples. Biodegradable and bio-compatible materials: bio-polymers and bio-implants; Fiber-reinforced 2D materials : graphene, graphite			
Module:8	LECTURE BY INDUSTRY EXPERTS	2 hours	
Total Lecture hours:		45 hours	
Text Book(s)			
I	<ol style="list-style-type: none"> 1. General Chemistry for Engineers by Jeffrey S. Gaffney and Nancy A Marley, Elsevier Publisher, 2018. 2. O.G. Palanna, McGraw Hill Education (India) Private Limited, 9th Reprint, 2015. 3. Corrosion Chemistry, Volkan Cicek and Bayan Al-Numan, Wiley Publishers, 2011 4. "Photovoltaic solar energy: From fundamentals to Applications", Angèle Reinders, Pierre Verlinden, Wilfried van Sark, Alexandre Freundlich, Wiley publishers, 2017. 		
Reference Books			
1.	Reference Books <ol style="list-style-type: none"> 1. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013. 2. Chemistry for Engineering students by Lawrence S Brown and Thomas A.Holme, 3rd Edition, CENGAGE Learning, 2015 		
II. Mode of Evaluation: Internal Assessment (CAT I, CAT-II, Quizzes, Digital Assignments & FAT			
Recommended by Board of Studies		09-11-2018	
Approved by Academic Council		No. 53	Date Date: 13-12-2018



Course code	Course title	L	T	P	J	C
ENG1000	Foundation English - I	0	0	4	0	0
Pre-requisite	Less than 50% EPT score	Syllabus Version				
		1				
Course Objectives:						
<ol style="list-style-type: none"> 1. To equip learners with English grammar and its application. 2. To enable learners to comprehend simple text and train them to speak and write flawlessly. 3. To familiarize learners with MTI and ways to overcome them. 						
Expected Course Outcome:						
<ol style="list-style-type: none"> 1. Develop the skills to communicate clearly through effective grammar, pronunciation and writing. 2. Understand everyday conversations in English 3. Communicate and respond to simple questions about oneself. 4. Improve vocabulary and expressions. 5. Prevent MTI (Mother Tongue Influence) during usual conversation. 						
Module:1	Essentials of grammar					3 Hours
Understand basic grammar-Parts of Speech Activity: Grammar worksheets on parts of speech						
Module:2	Vocabulary Building					3 Hours
Vocabulary development; One word substitution Activity: Elementary vocabulary exercises						
Module:3	Applied grammar and usage					4 Hours
Types of sentences; Tenses Activity: Grammar worksheets on types of sentences; tenses						
Module:4	Rectifying common errors in everyday conversation					4 Hours
Detect and rectify common mistakes in everyday conversation Activity: Common errors in prepositions, tenses, punctuation, spelling and other parts of speech; Colloquialism						
Module :5	Jumbled sentences					2 Hours
Sentence structure; Jumbled words to form sentences; Jumbled sentences to form paragraph/ short story Activity: Unscramble a paragraph / short story						
Module:6	Text-based Analysis					4 Hours
<i>Wings of Fire</i> -Autobiography of APJ Abdul Kalam (Excerpts) Activity: Enrich vocabulary by reading and analyzing the text						
Module:7	Correspondence					3 Hours
Letter, Email, Application Writing Activity: Compose letters; Emails, Leave applications						
Module:8	Listening for Understanding					4 Hours
Listening to simple conversations & gap fill exercises						



Activity: Simple conversations in Received Pronunciation using audio-visual materials.		
Module:9	Speaking to Convey	6 Hours
Self-introduction; role-plays; Everyday conversations Activity: Identify and communicate characteristic attitudes, values, and talents; Working and interacting within groups		
Module:10	Reading for developing pronunciation	6 Hours
Loud reading with focus on pronunciation by watching relevant video materials Activity: Practice pronunciation by reading aloud simple texts; Detecting syllables; Visually connecting to the words shown in relevant videos		
Module:11	Reading to Contemplate	4 Hours
Reading short stories and passages Activity: Reading and analyzing the author's point of view; Identifying the central idea.		
Module:12	Writing to Communicate	6 Hours
Paragraph Writing; Essay Writing; Short Story Writing Activity: Writing paragraphs, essays and short- stories		
Module:13	Interpreting Graphical Data	6 Hours
Describing graphical illustrations; interpreting basic charts, tables, and formats Activity: Interpreting and presenting simple graphical representations/charts in the form of PPTs		
Module:14	Overcoming Mother Tongue Influence (MTI) in Pronunciation	5 Hours
Practicing common variants in pronunciation Activity: Identifying and overcoming mother tongue influence.		
Total Laboratory Hours		60 Hours
Text Book / Workbook		
1.	Wren, P.C., & Martin, H. (2018). <i>High School English Grammar & Composition</i> N.D.V. PrasadaRao (Ed.). NewDelhi: S. Chand & Company Ltd.	
2.	McCarthy, M. O'Dell, F., & Bunting, J.D. (2010). <i>Vocabulary in Use(High Intermediate students book with answers)</i> . Cambridge University Press	
Reference Books		
1.	Watkins, P.(2018). <i>Teaching and Developing Reading Skills: Cambridge Handbooks for Language teachers</i> . Cambridge University Press.	
2.	Mishra, S., & Muralikrishna, C. (2014). <i>Communication Skills for Engineers</i> . Pearson Education India	
3	Lewis, N. (2011). <i>Word Power Made Easy</i> . Goyal Publisher	
4	https://americanliterature.com/short-short-stories	
5	Tiwari, A., & Kalam, A. (1999). <i>Wings of Fire - An Autobiography of Abdul Kalam</i> . Universities Press (India) Private Limited.	
Mode of Evaluation: Quizzes, Presentation, Discussion, Role Play, Assignments		
List of Challenging Experiments (Indicative)		
1.	Rearranging scrambled sentences	8 hours



2.	Identifying errors in oral and written communication	12 hours	
3.	Critically analyzing the text	8 hours	
4.	Developing passages from hint words	8 hours	
5.	Role-plays	12 hours	
6.	Listening to a short story and analyzing it	12 hours	
Total Laboratory Hours		60 hours	
Mode of Evaluation: Quizzes, Presentation, Discussion, Role Play, Assignments			
Recommended by Board of Studies	08-06-2019		
Approved by Academic Council	55	Date	13-06-2019



Course code	Course title				L	T	P	J	C
ENG2000	Foundation English - II				0	0	4	0	0
Pre-requisite	51% - 70% EPT / Foundation English I				Syllabus version				
					1				
Course Objectives:									
<ol style="list-style-type: none"> 1. To practice grammar and vocabulary effectively 2. To acquire proficiency levels in LSRW skills in diverse social situations. 3. To analyze information and converse effectively in technical communication. 									
Expected Course Outcome:									
<ol style="list-style-type: none"> 1. Accomplish a deliberate reading and writing process with proper grammar and vocabulary. 2. Comprehend sentence structures while Listening and Reading. 3. Communicate effectively and share ideas in formal and informal situations. 4. Understand specialized articles and technical instructions and write clear technical correspondence. 5. Critically think and analyze with verbal ability. 									
Module:1	Grammatical Aspects			4 hours					
Sentence Pattern, Modal Verbs, Concord (SVA), Conditionals, Connectives Activity : Worksheets, Exercises									
Module:2	Vocabulary Enrichment			4 hours					
Active & Passive Vocabulary, Prefix and Suffix, High Frequency Words Activity : Worksheets, Exercises									
Module:3	Phonics in English			4 Hours					
Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker Activity : Worksheets, Exercises									
Module:4	Syntactic and Semantic Errors			2 Hours					
Tenses /SVA/Articles/ Prepositions/ Punctuation & Right Choice of Vocabulary Activity : Worksheets, Exercises									
Module:5	Stylistic errors			2 Hours					
Dangling Modifiers, Parallelism, Standard English, Ambiguity, Redundancy, Brevity Activity : Worksheets, Exercises									
Module:6	Listening and Note making			6 Hours					
Intensive and Extensive Listening - Scenes from plays of Shakespeare (Eg: Court scene in <i>The Merchant of Venice</i> , Disguise Scene in <i>The Twelfth Night</i> , Death of Desdemona in <i>Othello</i> , Death scene in <i>Julius Caesar</i> and Balcony scene from <i>Romeo and Juliet</i>) Activity : Summarizing; Note-making and drawing inferences from Short videos									
Module:7	Art of Public Speaking			6 Hours					
Impromptu, Importance of Non-verbal Communication, Technical Talks, Dynamics of Professional Presentations – Individual & Group Activity : Ice Breaking; Extempore speech; Structured technical talk and Group presentation									
Module:8	Reading Comprehension Skills			4 Hours					



Skimming, scanning, comprehensive reading, guessing words from context, understanding text organization, recognizing argument and counter-argument; distinguishing between main information and supporting detail, fact and opinion, hypothesis versus evidence; summarizing and note-taking, Critical Reasoning Questions – Reading and Discussion Activity: Reading of Newspapers Articles and Worksheets on Critical Reasoning from web resources			
Module: 9	Creative Writing	4 Hours	
Structure of an essay, Developing ideas on analytical/ abstract topics Activity: Movie Review, Essay Writing on suggested Topics, Picture Descriptions			
Module: 10	Verbal Aptitude	6 hours	
Word Analogy, Sentence Completion using Appropriate words, Sentence Correction Activity: Practicing the use of appropriate words and sentences through web tools.			
Module: 11	Business Correspondence	4 hours	
Formal Letters- Format and purpose: Business Letters - Sales and complaint letter Activity: Letter writing- request for Internship, Industrial Visit and Recommendation			
Module: 12	Career Development	6 hours	
Telephone Etiquette, Resume Preparation, Video Profile Activity: Preparation of Video Profile			
Module: 13	Art of Technical Writing - I	4 hours	
Technical Instructions, Process and Functional Description Activity: Writing Technical Instructions			
Module: 14	Art of Technical Writing – II	4 hours	
Format of a Report and Proposal Activity: Technical Report Writing, Technical Proposal			
	Total Lecture hours:	60 hours	
Text Book / Workbook			
1.	Sanjay Kumar & Pushp Lata, <i>Communication Skills</i> , 2 nd Edition, OUP, 2015		
2	Wren & Martin, <i>High School English Grammar & Composition</i> , Regular ed., ND: Blackie ELT Books, 2018		
Reference Books			
1	Peter Watkins, <i>Teaching and Developing Reading Skills: Cambridge Handbooks for Language Teachers</i> , Cambridge, 2018		
2	Aruna Koneru, <i>Professional Speaking Skills</i> , OUP, 2015.		
3	J.C.Nesfield, <i>English Grammar English Grammar Composition and Usage</i> , Macmillan. 2019.		
4	Richard Johnson-Sheehan, <i>Technical Communication Today</i> , 6th edition, ND: Pearson, 2017.		
5	Balasubramaniam, <i>Textbook of English Phonetics For Indian Students</i> , 3rd Edition , S. Chand Publishers, 2013.		
Web Resources			



1. https://www.hitbullseye.com/Sentence-Correction-Practice.php			
2. https://hitbullseye.com/Critical-Reasoning-Practice-Questions.php			
Mode of Evaluation: Presentation, Discussion, Role Play, Assignments , FAT			
List of Challenging Experiments (Indicative)			
1.	Reading and Analyzing Critical Reasoning questions		
2.	Listening and Interpretation of Videos		
3.	Letter to the Editor		
4.	Developing structured Technical Talk		
5.	Drafting SOP (Statement of Purpose)		
6.	Video Profile		
Mode of Evaluation: Presentation, Discussion, Role Play, Assignments , FAT			
Recommended by Board of Studies		08.06.2019	
Approved by Academic Council		55	Date 13-06-2019



Course code	Course Title	L	T	P	J	C
ENG1901	Technical English - I	0	0	4	0	2
Pre-requisite		Syllabus version				
		1				
Course Objectives:						
1. To enhance students' knowledge of grammar and vocabulary to read and write error-free language in real life situations. 2. To make the students' practice the most common areas of written and spoken communications skills. 3. To improve students' communicative competency through listening and speaking activities in the classroom. .						
Expected Course Outcome:						
1. Develop a better understanding of advanced grammar rules and write grammatically correct sentences. 2. Acquire wide vocabulary and learn strategies for error-free communication. 3. Comprehend language and improve speaking skills in academic and social contexts. 4. Improve listening skills so as to understand complex business communication in a variety of global English accents through proper pronunciation. 5. Interpret texts, diagrams and improve both reading and writing skills which would help them in their academic as well as professional career						
Module:1	Advanced Grammar	4 hours				
Articles, Tenses, Voice and Prepositions Activity: Worksheets on Impersonal Passive Voice, Exercises from the prescribed text						
Module:2	Vocabulary Building I	4 hours				
Idioms and Phrases, Homonyms, Homophones and Homographs Activity: Jigsaw Puzzles; Vocabulary Activities through Web tools						
Module:3	Listening for Specific Purposes	4 hours				
Gist, monologues, short conversations, announcements, briefings and discussions Activity: Gap filling; Interpretations						
Module:4	Speaking for Expression	6 hours				
Introducing oneself and others, Making Requests & responses, Inviting and Accepting/Declining Invitations Activity: Brief introductions; Role-Play; Skit.						
Module:5	Reading for Informatio	4 hours				
Reading Short Passages, News Articles, Technical Papers and Short Stories Activity: Reading specific news paper articles; blogs						
Module:6	Writing Strategies	4 hours				
Joining the sentences, word order, sequencing the ideas, introduction and conclusion Activity: Short Paragraphs; Describing familiar events; story writing						
Module:7	Vocabulary Building II	4 hours				
Enrich the domain specific vocabulary by describing Objects, Charts, Food, Sports and Employment.						



Activity: Describing Objects, Charts, Food, Sports and Employment		
Module:8	Listening for Daily Life	4 hours
Listening for statistical information, Short extracts, Radio broadcasts and TV interviews Activity: Taking notes and Summarizing		
Module:9	Expressing Ideas and Opinions	6 hours
Telephonic conversations, Interpretation of Visuals and describing products and processes. Activity: Role-Play (Telephonic); Describing Products and Processes		
Module:10	Comprehensive Reading	4 hours
Reading Comprehension, Making inferences, Reading Graphics, Note-making, and Critical Reading. Activity: Sentence Completion; Cloze Tests		
Module:11	Narration	4 hours
Writing narrative short story, Personal milestones, official letters and E-mails. Activity: Writing an E-mail; Improving vocabulary and writing skills.		
Module :12	Pronunciation	4 hours
Speech Sounds, Word Stress, Intonation, Various accents Activity: Practicing Pronunciation through web tools; Listening to various accents of English		
Module :13	Editing	4 hours
Simple, Complex & Compound Sentences, Direct & Indirect Speech, Correction of Errors, Punctuations. Activity: Practicing Grammar		
Module:14	Short Story Analysis	4 hours
“The Boundary “ by Jhumpa Lahiri Activity: Reading and analyzing the theme of the short story.		
Total Lecture hours		60 hours
Text Book(s)		
1.	Wren, P.C.; Martin, H.; Prasada Rao, N.D.V. (1973–2010). <i>High School English Grammar & Composition</i> . New Delhi: Sultan Chand Publishers.	
2.	Kumar, Sanjay;; Pushp Latha. (2018) <i>English Language and Communication Skills for Engineers</i> , India: Oxford University Press.	
Reference Books		
1.	Guptha S C, (2012) <i>Practical English Grammar & Composition</i> , 1 st Edition, India: Arihant Publishers	
2.	Steven Brown, (2011) Dorolyn Smith, <i>Active Listening 3</i> , 3 rd Edition, UK: Cambridge University Press.	
3.	Liz Hamp-Lyons, Ben Heasley, (2010) <i>Study Writing</i> , 2 nd Edition, UK: Cambridge University Press.	
4.	Kenneth Anderson, Joan Maclean, (2013) Tony Lynch, <i>Study Speaking</i> , 2 nd Edition, UK: Cambridge, University Press.	
5.	Eric H. Glendinning, Beverly Holmstrom, (2012) <i>Study Reading</i> , 2 nd Edition, UK: Cambridge University Press.	
6.	Michael Swan, (2017) <i>Practical English Usage</i> (Practical English Usage), 4 th edition, UK:	



	Oxford University Press.		
7.	Michael McCarthy, Felicity O'Dell, (2015) <i>English Vocabulary in Use Advanced</i> (South Asian Edition), UK: Cambridge University Press.		
8.	Michael Swan, Catherine Walter, (2012) <i>Oxford English Grammar Course Advanced</i> , Feb, 4th Edition, UK: Oxford University Press.		
9.	Watkins, Peter. (2018) <i>Teaching and Developing Reading Skills: Cambridge Handbooks for Language teachers</i> , UK: Cambridge University Press.		
10.	(The Boundary by Jhumpa Lahiri) URL: https://www.newyorker.com/magazine/2018/01/29/the-boundary?intcid=inline_amp		
Mode of assessment: Quizzes, Presentation, Discussion, Role play, Assignments and FAT			
List of Challenging Experiments (Indicative)			
1.	Self-Introduction	12 hours	
2.	Sequencing Ideas and Writing a Paragraph	12 hours	
3.	Reading and Analyzing Technical Articles	8 hours	
4.	Listening for Specificity in Interviews (Content Specific)	12 hours	
5.	Identifying Errors in a Sentence or Paragraph	8 hours	
6.	Writing an E-mail by narrating life events	8 hours	
Total Laboratory Hours		60 hours	
Recommended by Board of Studies		08-06-2019	
Approved by Academic Council		No. 55	Date 13-06-2019



Course Code	Course Title	L	T	P	J	C
ENG 1902	Technical English - II	0	0	4	0	2
Pre-requisite	71% to 90% EPT score	Syllabus Version				
		1				
Course Objectives:						
<ol style="list-style-type: none"> To acquire proficiency levels in LSRW skills on par with the requirements for placement interviews of high-end companies / competitive exams. To evaluate complex arguments and to articulate their own positions on a range of technical and general topics. To speak in grammatical and acceptable English with minimal MTI, as well as develop a vast and active vocabulary. 						
Expected Course Outcome:						
<ol style="list-style-type: none"> Communicate proficiently in high-end interviews and exam situations and all social situations Comprehend academic articles and draw inferences Evaluate different perspectives on a topic Write clearly and convincingly in academic as well as general contexts Synthesize complex concepts and present them in speech and writing 						
Module:1	Listening for Clear Pronunciation					4 hours
Ice-breaking, Introduction to vowels, consonants, diphthongs. Listening to formal conversations in British and American accents (BBC and CNN) as well as other 'native' accents Activity: Factual and interpretive exercises; note-making in a variety of global English accents						
Module:2	Introducing Oneself					4 hours
Speaking: Individual Presentations Activity: Self-Introductions, Extempore speech						
Module:3	Effective Writing					6 hours
Writing: Business letters and Emails, Minutes and Memos Structure/ template of common business letters and emails: inquiry/ complaint/ placing an order; Formats of Minutes and Memos Activity: Students write a business letter and Minutes/ Memo						
Module:4	Comprehensive Reading					4 hours
Reading: Reading Comprehension Passages, Sentence Completion (Technical and General Interest), Vocabulary and Word Analogy Activities: Cloze tests, Logical reasoning, Advanced grammar exercises						
Module:5	Listening to Narratives					4 hours
Listening: Listening to audio files of short stories, News, TV Clips/ Documentaries, Motivational Speeches in UK/ US/ global English accents. Activity: Note-making and Interpretive exercises						
Module:6	Academic Writing and Editing					6 hours
Writing: Editing/ Proofreading symbols Citation Formats Structure of an Abstract and Research Paper Activity: Writing Abstracts and research paper; Work with Editing/ Proofreading exercise						
Module:7	Team Communication					4 hours



Speaking: Group Discussions and Debates on complex/ contemporary topics Discussion evaluation parameters, using logic in debates Activity: Group Discussions on general topics		
Module:8	Career-oriented Writing	4 hours
Writing: Resumes and Job Application Letters, SOP Activity: Writing resumes and SOPs		
Module:9	Reading for Pleasure	4 hours
Reading: Reading short stories Activity: Classroom discussion and note-making, critical appreciation of the short story		
Module: 10	Creative Writing	4 hours
Writing: Imaginative, narrative and descriptive prose Activity: Writing about personal experiences, unforgettable incidents, travelogues		
Module: 11	Academic Listening	4 hours
Listening: Listening in academic contexts Activity: Listening to lectures, Academic Discussions, Debates, Review Presentations, Research Talks, Project Review Meetings		
Module:12	Reading Nature-based Narratives	4 hours
Narratives on Climate Change, Nature and Environment Activity: Classroom discussions, student presentations		
Module:13	Technical Proposals	4 hours
Writing: Technical Proposals Activities: Writing a technical proposal		
Module:14	Presentation Skills	4 hours
Persuasive and Content-Specific Presentations Activity: Technical Presentations		
Total Lecture hours:		60 hours
Text Book / Workbook		
1.	Oxenden, Clive and Christina Latham-Koenig. <i>New English File: Advanced Students Book</i> . Paperback. Oxford University Press, UK, 2017.	
2	Rizvi, Ashraf. <i>Effective Technical Communication</i> . McGraw-Hill India, 2017.	
Reference Books		
1.	Oxenden, Clive and Christina Latham-Koenig, <i>New English File: Advanced: Teacher's Book with Test and Assessment</i> . CD-ROM: Six-level General English Course for Adults. Paperback. Oxford University Press, UK, 2013.	
2.	Balasubramanian, T. <i>English Phonetics for the Indian Students: A Workbook</i> . Laxmi Publications, 2016.	
3.	Philip Seargeant and Bill Greenwell, <i>From Language to Creative Writing</i> . Bloomsbury Academic, 2013.	
4.	Krishnaswamy, N. <i>Eco-English</i> . Bloomsbury India, 2015.	
5.	Manto, Saadat Hasan. <i>Selected Short Stories</i> . Trans. Aatish Taseer. Random House India, 2012.	
6.	Ghosh, Amitav. <i>The Hungry Tide</i> . Harper Collins, 2016.	
7.	Ghosh, Amitav. <i>The Great Derangement: Climate Change and the Unthinkable</i> . Penguin Books, 2016.	
8.	<i>The MLA Handbook for Writers of Research Papers</i> , 8th ed. 2016.	
	Online Sources: https://americanliterature.com/short-short-stories . (75 short short stories) http://www.eco-ction.org/dt/thinking.html (Leopold, Aldo. "Thinking like a Mountain") www.esl-lab.com/ ;	



www.bbc.co.uk/learningenglish/ ; www.bbc.com/news ; learningenglish.voanews.com/a/using-voa-learning-english-to-improve-listening-skills/3815547.html	
Mode of evaluation: Quizzes, Presentation, Discussion, Role play, Assignments and FAT	
List of Challenging Experiments (Indicative)	
1.	Self-Introduction using SWOT 12 hours
2.	Writing minutes of meetings 10 hours
3.	Writing an abstract 10 hours
4.	Listening to motivational speeches and interpretation 10 hours
5.	Cloze Test 6 hours
6.	Writing a proposal 12 hours
Total Laboratory Hours 60 hours	
Mode of evaluation: Quizzes, Presentation, Discussion, Role play, Assignments and FAT	
Recommended by Board of Studies	08.06.2019
Approved by Academic Council	55 Date: 13-06-2019



Course code	Course Title	L	T	P	J	C	
ENG1903	Advanced Technical English	0	0	2	4	2	
Pre-requisite	Greater than 90 % EPT score	Syllabus version					1
Course Objectives:							
1. To review literature in any form or any technical article 2. To infer content in social media and respond accordingly 3. To communicate with people across the globe overcoming trans-cultural barriers and negotiate successfully							
Expected Course Outcome:							
1. Analyze critically and write good reviews 2. Articulate research papers, project proposals and reports 3. Communicate effectively in a trans-cultural environment 4. Negotiate and lead teams towards success 5. Present ideas in an effective manner using web tools							
Module:1	Negotiation and Decision Making Skills through Literary Analysis						5 hours
Concepts of Negotiation and Decision Making Skills Activity: Analysis of excerpts from Shakespeare's —The Merchant of Venice (court scene) and discussion on negotiation skills. Critical evaluation of excerpts from Shakespeare's —Hamlet (Monologue by Hamlet) and discussion on decision making skills							
Module:2	Writing reviews and abstracts through movie interpretations						5 hours
Review writing and abstract writing with competency Activity: Watching Charles Dickens —Great Expectations and writing a movie review Watching William F. Nolan's —Logan's Run and analyzing it in tune with the present scenario of depletion of resources and writing an abstract							
Module:3	Technical Writing						4 hours
Stimulate effective linguistics for writing: content and style Activity: Proofreading Statement of Purpose							
Module:4	Trans-Cultural Communication						4 hours
Nuances of Trans-cultural communication Activity: Group discussion and case studies on trans-cultural communication. Debate on trans-cultural communication.							
Module:5	Report Writing and Content Writing						4 hours
Enhancing reportage on relevant audio-visuals Activity: Watch a documentary on social issues and draft a report Identify a video on any social issue and interpret							
Module:6	Drafting project proposals and article writing						4 hours
Dynamics of drafting project proposals and research articles							



Activity: Writing a project proposal.		
Module:7	Technical Presentations	4 hours
Build smart presentation skills and strategies Activity: Technical presentations using PPT and Web tools		
Total Lecture hours		30 hours
Text Book(s)		
1.	Raman, Meenakshi & Sangeeta Sharma. <i>Technical Communication: Principles and Practice</i> , 3rd edition, Oxford University Press, 2015.	
Reference Books		
1.	Basu B.N. <i>Technical Writing</i> , 2011 Kindle edition	
2.	Arathoon, Anita. <i>Shakespeare's The Merchant of Venice</i> (Text with Paraphrase), Evergreen Publishers, 2015.	
3.	Kumar, Sanjay and Pushp Lata. <i>English Language and Communication Skills for Engineers</i> , Oxford University Press, India, 2018.	
4.	Frantisek, Burda. <i>On Transcultural Communication</i> , 2015, LAP Lambert Academic Publishing, UK.	
5.	Geever, C. Jane. <i>The Foundation Center's Guide to Proposal Writing</i> , 5th Edition, 2007, Reprint 2012 The Foundation Center, USA.	
6.	Young, Milena. <i>Hacking Your Statement of Purpose: A Concise Guide to Writing Your SOP</i> , 2014 Kindle Edition.	
7.	C Muralikrishna & Sunitha Mishra, <i>Communication Skills for Engineers</i> , 2nd edition, NY: Pearson, 2011.	
8.	Ray, Ratri, <i>William Shakespeare's Hamlet</i> , The Atlantic Publishers, 2011.	
Mode of assessment: Quizzes, Presentation, Discussion, Role play, Assignments and FAT		
List of Challenging Experiments (Indicative)		
1.	Enacting a court scene - Speaking	6 hours
2.	Watching a movie and writing a review	4 hours
3.	Trans-cultural – case studies	2 hours
4.	Drafting a report on any social issue	6 hours
5.	Technical Presentation using web tools	6 hours
6.	Writing a research paper	6 hours
J- Component Sample Projects		
1.	Short Films	



2.	Field Visits and Reporting	
3.	Case studies	
4.	Writing blogs	
5.	Vlogging	
Total Hours (J – Components)		60 hours
Mode of evaluation: Quizzes, Presentation, Discussion, Role play, Assignments and FAT		
Recommended by Board of Studies		08-06-2019
Approved by Academic Council		No. 55 Date 13-06-2019



FRE1001	FRANÇAIS QUOTIDIEN	L	T	P	J	C
		2	0	0	0	2
Pre-requisite	NIL	Syllabus version				
		1.0				
Course Objectives:						
The course gives students the necessary background to: <ol style="list-style-type: none">1. Learn the basics of French language and to communicate effectively in French in their day to day life.2. Achieve functional proficiency in listening, speaking, reading and writing3. Recognize culture-specific perspectives and values embedded in French language.						
Expected Course Outcome:						
The students will be able to :						
<ol style="list-style-type: none">1. Identify in French language the daily life communicative situations via personal pronouns, emphatic pronouns, salutations, negations and interrogations.2. Communicate effectively in French language via regular / irregular verbs.3. Demonstrate comprehension of the spoken / written language in translating simple sentences.4. Understand and demonstrate the comprehension of some particular new range of unseen written materials5. Demonstrate a clear understanding of the French culture through the language studied						
Module: 1	Expressions simples					3 hours
Les Salutations, Les nombres (1-100), Les jours de la semaine, Les mois de l'année, Les Pronoms Sujets, Les Pronoms Toniques, La conjugaison des verbes irréguliers- avoir / être / aller / venir / faire etc. Savoir-faire pour: Saluer, Se présenter, Présenter quelqu'un, Etablir des contacts						
Module: 2	La conjugaison des verbes réguliers					3 hours
La conjugaison des verbes réguliers, La conjugaison des verbes pronominaux, La Négation, L'interrogation avec 'Est-ce que ou sans Est-ce que'. Savoir-faire pour: Chercher un(e) correspondant(e), Demander des nouvelles d'une personne.						
Module: 3	La Nationalité du Pays, L'article (défini/ indéfini), Les prépositions					6 hours
La Nationalité du Pays, L'article (défini/ indéfini), Les prépositions (à/en/au/aux/sur/dans/avec etc.), L'article contracté, Les heures en français, L'adjectif (La Couleur, L'adjectif possessif, L'adjectif démonstratif/ L'adjectif interrogatif (quel/quelles/quelle/quelles), L'accord des adjectifs avec le nom, L'interrogation avec Comment/ Combien / Où etc. Savoir-faire pour: Poser des questions, Dire la date et les heures en français,						
Module: 4	La traduction simple					4 hours
La traduction simple :(français-anglais / anglais –français), Savoir-faire pour : Faire des achats, Comprendre un texte court, Demander et indiquer le chemin.						
Module: 5	L'article Partitif, Mettez les phrases aux pluriels					5 hours
L'article Partitif, Mettez les phrases aux pluriels, Faites une phrase avec les mots donnés, Trouvez les questions. Savoir-faire pour : Répondez aux questions générales en français, Exprimez les phrases données au Masculin ou au Féminin, Associez les phrases.						
Module: 6	Décrivez :					3 hours



Décrivez: La Famille / La Maison / L'université / Les Loisirs / La Vie quotidienne etc.			
Module: 7	Dialogue		4 hours
Dialogue:			
<ol style="list-style-type: none"> 1. Décrire une personne. 2. Des conversations à la cafeteria. 3. Des conversations avec les membres de la famille 4. Des dialogues entre les amis. 			
Module: 8	Guest lectures		2 hours
Guest lectures / Natives speakers			
Total Lecture hours			30 hours
Text Book(s)			
1.	Fréquence jeunes-1, Méthode de français, G. Capelle et N.Gidon, Hachette, Paris, 2010.		
2.	Fréquence jeunes-1, Cahier d'exercices, G. Capelle et N.Gidon, Hachette, Paris, 2010.		
Reference Books			
1.	CONNEXIONS 1, Méthode de français, Régine Mérieux, Yves Loiseau, Les Éditions Didier, 2010.		
2.	CONNEXIONS 1, Le cahier d'exercices, Régine Mérieux, Yves Loiseau, Les Éditions Didier, 2010		
3.	ALTER EGO 1, Méthode de français, Annie Berthet, Catherine Hugo, Véronique M. Kizirian, Béatrix Sampsonis, Monique Waendendries, Hachette livre Paris 2011		
4.	ALTER EGO 1, Le cahier d'activités, Annie Berthet, Catherine Hugo, Béatrix Sampsonis, Monique Waendendries, Hachette livre, Paris 2011		
Mode of Evaluation: CAT / Assignment / Quiz / Seminar / FAT			
Recommended by Board of Studies		26.02.2016	
Approved by Academic Council		41 st ACM	Date 17.06.2016



GER1001	GRUNDSTUFE DEUTSCH	L	T	P	J	C
		2	0	0	0	2
Pre-requisite	Nil	Syllabus version				
1.0						
Course Objectives:						
<p>The course gives students the necessary background to:</p> <ol style="list-style-type: none"> 1. Demonstrate Proficiency in reading, writing, and speaking in basic German. Learning vocabulary related to profession, education centres, day-to-day activities, food, culture, sports and hobby, family set up, workplace, market and classroom activities are essential. 2. Make the students industry oriented and make them adapt in the German culture. 						
Expected Course Outcome:						
<p>The students will be able to</p> <ol style="list-style-type: none"> 1. Remember greeting people, introducing oneself and understanding basic expressions in German. 2. Understand basic grammar skills to use these in a meaning way. 3. Remember beginner's level vocabulary 4. Create sentences in German on a variety of topics with significant precision and in detail. 5. Apply good comprehension of written discourse in areas of special interests. 						
Module: 1						3 hours
Begrüßung, Landeskunde, Alphabet, Personalpronomen, Verben- heissen, kommen, wohnen, lernen, Zahlen (1-100), W-Fragen, Aussagesätze, Nomen- Singular und Plural, der Artikel -Bestimmter-Unbestimmter Artikel)						
Lernziel :						
Sich vorstellen, Grundlegendes Verständnis von Deutsch, Deutschland in Europa						
Module: 2						3 hours
Konjugation der Verben (regelmässig /unregelmässig),das Jahr- Monate, Jahreszeiten und die Woche, Hobbys, Berufe, Artikel, Zahlen (Hundert bis eine Million), Ja-/Nein- Frage, Imperativ mit „Sie“						
Lernziel:						
Sätze schreiben, über Hobbys, Berufe erzählen, usw						
Module: 3						5 hours
Possessivpronomen, Negation, Kasus (Bestimmter- Unbestimmter Artikel) Trennbareverben, Modalverben, Uhrzeit, Präpositionen, Lebensmittel, Getränkeund Essen, Farben, Tiere						
Lernziel :						
Sätze mit Modalverben, Verwendung von Artikel, Adjektiv beim Verb						
Module: 4						5 hours
Übersetzung: (Deutsch – Englisch / Englisch – Deutsch)						
Lernziel :						
Die Übung von Grammatik und Wortschatz						
Module: 5						5 hours
Leserverständnis. Mindmap machen, Korrespondenz- Briefe und Email						
Lernziel:						
Übung der Sprache, Wortschatzbildung						
Module: 6						3 hours
Aufsätze : Die Familie, Bundesländer in Deutschland, Ein Fest in Deutschland,						
Lernziel :						
Aktiver, selbständiger Gebrauch der Sprache						
Module: 7						4 hours



Dialoge:			
a) Gespräche mit einem/einer Freund /Freundin.			
b) Gespräche beim Einkaufen ; in einem Supermarkt ; in einer Buchhandlung ;			
c) in einem Hotel - an der Rezeption ; ein Termin beim Arzt.			
d) Ein Telefongespräch ; Einladung–Abendessen			
Module: 8			2 hours
Guest Lectures / Native Speakers Einleitung in die deutsche Kultur und Politik			
Total Lecture hours			30 hours
Text Book(s)			
1.	Netzwerk Deutsch als Fremdsprache A1, Stefanie Dengler, Paul Rusch, Helen Schmtiz, Tanja Sieber, Klett-Langenscheidt Verlag, München : 2013		
Reference Books			
1.	Lagune, Hartmut Aufderstrasse, Jutta Müller, Thomas Storz, 2012.		
2.	Deutsche Sprachlehre für Ausländer, Heinz Griesbach, Dora Schulz, 2013		
3.	Studio d A1, Hermann Funk, Christina Kuhn, CorneslenVerlag, Berlin: 2010		
4.	Tangram Aktuell-I, Maria-Rosa, SchoenherrTil, Max Hueber Verlag, Muenchen: 2012		
	www.goethe.de wirtschaftsdeutsch.de hueber.de klett-sprachen.de www.deutschtraning.org		
Mode of Evaluation: CAT / Assignment / Quiz / Seminar / FAT			
Recommended by Board of Studies		04.03.2016	
Approved by Academic Council		41 st ACM	Date 17.06.2016



HUM1021	ETHICS AND VALUES	L	T	P	J	C
		2	0	0	0	2
Pre-requisite	Nil	Syllabus version				
		1.2				
Course Objectives:						
1. To understand and appreciate the ethical issues faced by an individual in profession, society and polity 2. To understand the negative health impacts of certain unhealthy behaviors 3. To appreciate the need and importance of physical, emotional health and social health						
Expected Course Outcome:						
Students will be able to: 1. Follow sound morals and ethical values scrupulously to prove as good citizens 2. Understand various social problems and learn to act ethically 3. Understand the concept of addiction and how it will affect the physical and mental health 4. Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects 5. Identify the main typologies, characteristics, activities, actors and forms of cybercrime						
Module: 1	Being good and responsible	5 hours				
Gandhian values such as truth and non-violence – comparative analysis on leaders of past and present – society’s interests versus self-interests–Personal Social Responsibility: Helping the needy, charity and serving the society.						
Module: 2	Social Issues 1	4 hours				
Harassment – types - Prevention of harassment, violence and terrorism						
Module: 3	Social Issues 2	4 hours				
Corruption: ethical values, causes, impact, laws, prevention – electoral malpractices white collar crimes – tax evasions – unfair trade practices						
Module: 4	Addiction and Health	3 hours				
Peer pressure - Alcoholism: ethical values, causes, impact, laws, prevention – Ill effects of smoking – Prevention of Suicides						
Sexual Health: Prevention and impact of pre-marital pregnancy and Sexually Transmitted Diseases						
Module: 5	Drug Abuse	4 hours				
Abuse of different types of legal and illegal drugs: ethical values, causes, impact, laws and prevention						
Module: 6	Personal and Professional Ethics	3 hours				
Dishonesty - Stealing - Malpractices in Examinations – Plagiarism						
Module: 7	Abuse of technologies	4 hours				
Hacking and other cyber crimes, addiction to mobile phone usage, video games and social networking websites						
Module: 8	Invited Talk: Contemporary Issues	3 hours				
Total Lecture hours						30 hours
Reference Books						
1.	Dhaliwal, K.K (2016), “Gandhian Philosophy of Ethics: A Study of Relationship between his Presupposition and Precepts, Writers Choice, New Delhi, India					



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2.	Vittal, N (2012), “Ending Corruption? - How to Clean up India?”, Penguin Publishers, UK		
3.	Pagliari, L.A. and Pagliaro, A.M (2012), “Handbook of Child and Adolescent Drug and Substance Abuse: Pharmacological , Developmental and Clinical Considerations”, Wiley Publishers, U.S.A		
4.	Pandey, P. K (2012), “Sexual Harassment and Law in India”, Lambert Publishers, Germany		
Mode of Evaluation: CAT, Assignment, Quiz, FAT and Seminar			
Recommended by Board of Studies	26.07.2017		
Approved by Academic Council	46 th ACM	Date	24.08.2017



MGT1022	LEAN START-UP MANAGEMENT	L	T	P	J	C
		1	0	0	4	2
Pre-requisite	Nil	Syllabus version				
		1.0				
Course Objectives:						
To develop the ability to <ol style="list-style-type: none"> 1. Learn methods of company formation and management. 2. Gain practical skills in and experience of stating of business using pre-set collection of business ideas. 3. Learn basics of entrepreneurial skills. 						
Expected Course Outcome:						
On completion of this course the students will be able to: <ol style="list-style-type: none"> 1. Understand developing business models and growth drivers 2. Use the business model canvas to map out key components of enterprise 3. Analyze market size, cost structure, revenue streams, and value chain 4. Understand build-measure-learn principles 5. Foreseeing and quantifying business and financial risks 						
Module: 1						2hours
Creativity and Design Thinking (identify the vertical for business opportunity, understand your customers, accurately assess market opportunity)						
Module: 2						3 hours
Minimum Viable Product (Value Proposition, Customer Segments, Build-measure-learn process)						
Module: 3						3hours
Business Model Development (Channels and Partners, Revenue Model and streams, Key Resources, Activities and Costs, Customer Relationships and Customer Development Processes, Business model canvas–the lean model-templates)						
Module: 4						3 hours
Business Plan and Access to Funding (visioning your venture, taking the product / service to market, Market plan including Digital & Viral Marketing, start-up finance – Costs / Profits & Losses / cash flow, Angel / VC / Bank Loans and Key elements of raising money)						
Module: 5						2hours
Legal, Regulatory, CSR, Standards, Taxes						
Module: 6						2 hours
Lectures by Entrepreneurs						
Total Lecture hours					15 hours	
Text Book (s)						
1.	Steve Blank, K & S Ranch (2012)The Startup Owner's Manual: The Step-By-Step Guide for Building a Great Company, 1 st edition					
2.	Steve Blank (2013) The Four Steps to the Epiphany, K&S Ranch; 2 nd edition					
3.	Eric Ries (2011) The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses, Crown Business					
Reference Books						
1.	Holding a Cat by the Tail, Steve Blank, K & S Ranch Publishing LLC (August 14, 2014)					



2.	Product Design and Development, Karal TUlrich, SDEppinger, McGrawHill		
3.	Zero to One: Notes on Startups, or How to Build the Future, Peter Thiel, Crown Business (2014)		
4.	Lean Analytics: Use Data to Build a Better Startup Faster (Lean Series), Alistair Croll & Benjamin Yoskovitz, O' Reilly Media; 1 st Edition (March 21, 2013)		
5.	Inspired: How to create Products Customers Love, Marty Cagan,S VPG Press; 1 st edition (June18, 2008)		
6.	Website References: 1. http://theleanstartup.com/ 2. https://www.kickstarter.com/projects/881308232/only-on-kickstarter-the-leaders-guide-by-eric-ries 3. http://businessmodelgeneration.com/ 4. https://www.leanstartupmachine.com/ 5. https://www.youtube.com/watch?v=fEvKo90qBns 6. http://thenextweb.com/entrepreneur/2015/07/05/whats-wrong-with-the-lean-startup-methodology/#gref 7. http://www.businessinsider.in/Whats-Lean-about-Lean-Startup/articleshow/53615661.cms 8. https://steveblank.com/tools-and-blogs-for-entrepreneurs/ 9. https://hbr.org/2013/05/why-the-lean-start-up-changes-everything 10. chventures.blogspot.in/platformsandnetworks.blogspot.in/p/saas-model.html		
Teaching Modes: Assignments; Field Trips, Case Studies; e-learning; Learning through research, TED Talks			
Project			
1.	Project	60 hours	
Total Project		60 hours	
Recommended by Board of Studies		08.06.2015	
Approved by Academic Council		37 th ACM	Date 16.06.2015



Course code	DESIGN WORKSHOP	L	T	P	J	C
MEE1025		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.00				
Course Objectives:						
The students will be able to,						
1. Understanding the representation principles and applying to various projects to familiarize with the basic manufacturing processes.						
2. Learn to use the relevant tools and equipment for Product design and development.						
3. Acquire competence to use hand tools and machines tools.						
Expected Course Outcome:						
The students will have,						
1. Skills to operate hand tools and machines tools for model-making.						
2. Knowledge about different types of joineries in metal and wood.						
3. Ability to master different decorative techniques.						
Module:1		6 hours				
Introduction to types of tools and safe handling of hand and power tools.						
Module:2		8 hours				
Orientation for operating different types of machines such as Shaper, Planner, Grinder, Sander, Fly press, Jig saw, Saw machine, Drilling, Lathe, Milling, and Laser cutting.						
Module:3		8 hours				
Hands on practice using Shaper, Planner machine, and Drilling machine.						
Module:4		8 hours				
Hands on practice using Grinding machine and Jig-saw machine.						
Module:5		6 hours				
Hands on practice using soft materials for model making.						
Module:6		10 hours				
Hands on practice using hard materials for model making.						
Module:7		10 hours				
Hands on practice in decorative techniques.						
Module:8	Contemporary issues:	4 hours				
Contemporary discussion with professional model-makers.						
		Total Lab hours:		60 hours		
Text Book(s)						
	The Workshop Book: How to design and lead successful workshops - <u>Pamela Hamilton</u> 2016					



Reference Books

1. Engineering Work shop practice for JNTU/V. Ramesh Babu/VRB Publishers Pvt. Ltd.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers
3. Engineering Practices Lab Manual/Jeyapoovan, SaravanaPandian/Vikas publishers
4. Dictionary of Mechanical Engineering/GHF Nayler/Jaico Publishing House.
5. Machine Design Paperback – 3 Jul 2005 - R.S. Khurmi (Author)
6. Theory of Machines Paperback – 1 Aug 2005 - by R.S. Khurmi (Author)

Mode of Evaluation: Assignment / FAT / Project

Recommended by Board of Studies | 27-11-2019

Approved by Academic Council | No. 57 | Date | 05-12-2019



Course code	Summer Project on Social Concern				L	T	P	J	C
BDE1032					0	0	4	4	3
Pre-requisite					Syllabus version				
					v. 1				
Course Objectives:									
<ul style="list-style-type: none"> • Understanding the fundamentals of part modelling • Understanding various aspects of product component generation • Ability to manipulate a 2D drawing to a high-Fidelity model. 									
Expected Course Outcome:									
The students will have,									
<ol style="list-style-type: none"> 1. Ability generate parts using modelling techniques 2. Ability to create Reverse engineering of a given component 3. Ability to make Assembly and 2d drawings of the models 4. Understanding to make draft for mould manufacturing 5. Ability to make high fidelity model 6. Ability to use rapid manufacturing techniques to create prototype 									
Mode of Evaluation: Internship Report, Presentation and Project Review									
Recommended by Board of Studies					03-03-2018				
Approved by Academic Council					No. 49		Date		15-03-2018



Course code	Industrial Internship (Summer)				L	T	P	J	C
BDE3099					0	0	0	0	3
Pre-requisite	Completion of minimum of Two semesters				Syllabus version				
					v. 1.0				
Course Objectives:									
The course is designed so as to expose the students to industry environment and to take up on-site assignment as trainees or interns.									
Expected Course Outcome:									
At the end of this internship the student should be able to:									
<ol style="list-style-type: none"> 1. Have an exposure to industrial practices and to work in teams. 2. Communicate effectively. 3. Understand the impact of design solutions in a global, economic, environmental and societal context. 4. Develop the ability to engage in research and to involve in life-long learning. 5. Comprehend contemporary issues. 6. Engage in establishing his/her digital footprint. 									
Contents									
								8 Weeks	
Eight weeks of work at industry physically/remotely, and supervised by an expert of that industry.									
Mode of Evaluation: Internship Report, Presentation and Project Review									
Recommended by Board of Studies				24-09-2020					
Approved by Academic Council				59		Date		24-09-2020	



Course code	CAPSTONE PROJECT	L	T	P	J	C
BDE4099		0	0	0	0	20
Pre-requisite	As per the academic regulations	Syllabus version				
		v. 1.0				
Course Objectives:						
<ol style="list-style-type: none"> 1. To provide a definite context, to apply the leanings from various courses of the program and solve unstructured and ill-defined problems 2. To develop an integrated approach for problem solving 3. To provide an exposure to take up a real-life research problem / product development / industrial problem and arrive at meaningful conclusions / product design / solution. 						
Expected Course Outcome:						
<p>Upon successful completion of the course the students will be able to,</p> <ol style="list-style-type: none"> 1. Formulate specific problem statements for ill-defined real life problems with reasonable assumptions and constraints. 2. Perform literature search and / or patent search in the area of interest. 3. Develop a suitable solution methodology for the problem. 4. Conduct experiments / Design & Analysis / solution iterations and document the results. 5. Perform error analysis / benchmarking / costing. 6. Synthesis the results and arrive at scientific conclusions / products / solution. 7. Document the results in the form of technical report / presentation. 						
Topics						
<p>Capstone Project may be a modeling & simulation, experimentation & analysis, prototype design, fabrication of new equipment, software development, etc. or a combination of these.</p> <p>Capstone Project will be for one semester as per the academic regulations.</p>						
Criteria						
<ol style="list-style-type: none"> 1. Can be individual work or a group project, with a maximum of 3 students. 2. In case of group projects, the individual project report of each student should specify the individual's contribution to the group project. 3. Carried out inside or outside the university, in any relevant industry or research institution. 4. Publications in the peer reviewed journals / International Conferences will be an added advantage. 5. Plagiarism checking by Turnitin is compulsory part of UG Project Report. Plagiarism level should not exceed more than 13%. 						
Mode of Evaluation: Mid reviews, Final Viva-Voce, Thesis and Poster Submission						
Recommended by Board of Studies		24-09-2020				
Approved by Academic Council		59	Date	24-09-2020		



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**PROGRAM CORE
COURSES**



Course code	Design Fundamentals - 2D	L	T	P	J	C
BDE1001		0	0	4	4	3
Pre-requisite		Syllabus version				
		1.0				
Course Objectives:						
<ul style="list-style-type: none"> • Understanding the fundamentals of 2-dimensional design. • Understanding the elements of design for 2-dimension. • Obtain a knowledge and ability to use the appropriate tools to design and develop new compositions. 						
Expected Course Outcome:						
<p>The students will have,</p> <ol style="list-style-type: none"> 1. Ability to generate two dimensional rhythms, deformations and patterns in design. 2. Understanding in cognitive, morphological process inherent in applying shape analogies for generating two-dimensional design concepts. 3. Design a composition of low complexity and with relatively simple geometry. 4. Carry out semantic analysis of visual elements. 						
Module:1		6 hours				
Understanding the various elements and principles of art and design in 2D.						
Module:2		8 hours				
Expressions and explorations using points, lines, planes and volumes and its relation in context to nature and environment.						
Module:3		8 hours				
Expressions and explorations using points, lines, planes and volumes and its relation in context to nature and environment.						
Module:4		8 hours				
Study and understanding of frame of reference or point of views.						
Module:5		6 hours				
Principles of colour theory and explorations.						
Module:6		10 hours				



Visual relationships – Balance, proportion, order, symmetry, rhythm, etc.,			
Module:7			
		10 hours	
Visual principles of composition: Grids, layouts, symmetry, balance and asymmetry.			
Module:8			
Contemporary issues:		8 hours	
Contemporary discussion with the artists and designers.			
		Total Lecture hours: 60 hours	
Text Book(s)			
1.	Greet Hannah, Elements of Design, Princeton Architectural Press, 2002.		
	Lauer, David; Design Basics, Wadsworth Publishing, 1999		
	L. Hotzschue; Understanding Colour, VNR, 1995		
Reference Books			
1.	W. Wong; Principles Of Two Dimensional Design, John Wiley And Sons, 1972		
2.	J. Bowers; Introduction To Two---Dimensional Design: Understanding Form And function, John Wiley & Sons, 1999		
Mode of Evaluation: Assignment / FAT / Project / Seminar			
Mode of assessment:			
Recommended by Board of Studies		03-03-2018	
Approved by Academic Council		No. 49	Date 15-03-2018



Course code	IMAGE REPRESENTATION TECHNIQUES	L	T	P	J	C
BDE1002		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.20				
Course Objectives:						
1. To acquaint students with basics of Image representation. 2. Obtain a knowledge on various perspectives on sketches through various representation techniques. 3. Obtain a knowledge and ability to use the appropriate construction techniques to design.						
Expected Course Outcome:						
Students will have, <ol style="list-style-type: none"> 1. Represent objects through constructive methodologies. 2. Represent objects in nature.. 3. Construct human figure and manikin movement. 4. Represent objects/products in various perspectives. 5. Represent objects using light and shadow techniques. 6. Ability to represent objects by grid 						
Module:1		6 hours				
Object Representation						
Module:2		8 hours				
Representing nature						
Module:3		8 hours				
Figure drawing						
Module:4		8 hours				
One point, Two point, and Three point Perspective						
Module:5		6 hours				
Studies in light and shadow on 3-dimensional Form Representations						
Module:6		10 hours				
Grid based drawing, Analytical Representation						
Module:7		10 hours				
Exposure and demonstration of Illustration and Image making software						
Module:8	Contemporary issues:				4 hours	
Contemporary discussion with the artists and designers.						
		Total Lecture hours:	60 hours			
Text Book(s)						
1.	Edwards, Betty; New Drawing on the Right Side of the Brain, Publisher: Tarcher; 2002					
Reference Books						
1.	Dalley Terence ed.; The complete guide to illustration & design, Phaidon, Oxford, 1980					
2.	T. C. Wang; Pencil Sketching, John Wiley & Sons, 1997					
3.	Pogany, Willy ; The Art of Drawing, Publisher: Madison Books, 1996					
4.	R. Kasprin; Design Media – Techniques for water colour, pen and ink, pastel and coloured markers, John Wiley & Sons, 1999					



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Mode of Evaluation: Assignment / FAT / Project / Seminar			
Recommended by Board of Studies	03-03-2018		
Approved by Academic Council	No. 49	Date	15-03-2018



Course code	DESIGN STUDIO – PROBLEM IDENTIFICATION	L	T	P	J	C
BDE1003		0	0	4	4	3
Pre-requisite		Syllabus version				
		1				
Course Objectives:						
<ol style="list-style-type: none"> 1. Understanding user centric design. 2. Understanding process of design. 3. Obtain knowledge and ability to identify problems faced by the user. 						
Expected Course Outcome:						
The students will have,						
<ol style="list-style-type: none"> 1. Ability to keenly observe the design ecosystem. 2. Understanding the cognitive load of the user. 3. Knowledge on documenting the observations using different mediums. 4. Ability to identify design problems. 						
Module:1		6 hours				
Introduction to Design and its ecosystem.						
Module:2		8 hours				
Introduction to the process of design						
Module:3		8 hours				
Inquiry and observations.						
Module:4		8 hours				
Documenting the activities.						
Module:5		6 hours				
Documenting the environments						
Module:6		10hours				
Problem identification or need finding.						
Module:7		10 hours				
Redesign of a simple problem that involves both communication and product design issues.						
Module:8	Contemporary issues:					4 hours
Contemporary discussion with the artists and designers.						
		Total Lecture hours:	60 hours			
Text Book(s)						
1.	D. Norman; The Design Of Everyday things, London, The MIT Press, 1998					
2.	A Forty; Objects Of Desire, Thems & Hudson 1995					



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3.	J. De Noblet ed., Industrial Design--- Reflections Of a century, Thames & Hudson, 1993	
Reference Books		
1.	Julier, G.; 20th Century Design, Thames & Hudson, 1993.	
2.	Potter, Norman; What Is a Designer: Things, Places, Messages, Princeton Architectural Press, 2002	
Mode of Evaluation: Assignment / FAT / Project / Seminar		
Mode of assessment:		
Recommended by Board of Studies	03-03-2018	
Approved by Academic Council	No. 49	Date - 15-03-2018



Course code	FUNDAMENTALS OF ERGONOMICS	L	T	P	J	C
BDE1004		2	0	2	0	3
Pre-requisite		Syllabus version				
		v. 2.00				
Course Objectives:						
Students will be able to,						
<ol style="list-style-type: none"> 1. Implement ergonomic principles in industrial design. 2. Understand the importance and techniques of human biological data collection and experiments. 3. Investigate towards accidents and Safety Management. 						
Expected Course Outcome:						
The students will have,						
<ol style="list-style-type: none"> 1. Knowledge of ergonomic principles. 2. Proper understanding of human anthropometry. 3. Knowledge of the human body motions and limitations. 4. Knowledge of environment factors and performance support. 5. Ability to analyse the non-tangible human factors. 6. Good understanding of anthropometry and its importance in designing products. 						
Module:1	Introducing Ergonomics	4 hours				
Brief history of Ergonomics and Human Factors. Perspectives and Aspects of Ergonomics. Clarification of Ergonomics -Physical/Cognitive/Organizational/Industrial/Occupational. Applications of Ergonomics. Idea of System & Man – Machine – Environment.						
Module:2	Human Aspect Fundamentals	4 hours				
Preliminary Anatomy – Musculoskeletal system. Body Dynamics. Basic Body Mechanics. Postures – Sitting, standing, etc., and relation to task/job. Posture and body supporting devices.						
Module:3	Physical Ergonomics	4 hours				
Body Dimensions – Static & Dynamic Anthropometry and Measurement techniques. Workstation – Idea and basics of Workspace Design. Task Design. Fitting the task to the human. Statistical linkage to Workstation and task design. Target population and fitting workstation and task to them. Workload – all aspects.						
Module:4	Environmental impact on Human Factors	4 hours				
Stress due to Adverse Environment. Heat & Cold. Performance impact with respect to Light, Sound and Vibration. Preventive measures and Personal protective equipment.						
Module:5	Organisational Ergonomics	4 hours				
Goals/Targets and their achievements. Organisation behaviour. Occupational safety and hygiene practices. Training promotion and rewards. Organisational support -Workspace ambient environment. Compatibility, comfort, adaptability in Workplace.						
Module:6	Cognitive Ergonomics and Design	4 hours				
Cognitive and behavioural aspects in psychological ambience – Stereotype. Information is processing – attention, concentration, perception, memory, vigilance, planning and decision making. Mental workload –						



Error, Failure and violations by human. Risk – perception and prevention. Cross-cultural Design.			
Module:7	Industrial Aspects of Ergonomic Design	4 hours	
Occupational safety to reduce fatigue, errors, failures, and accidents. Ergonomic design practices. Ergonomic practice checklists for Design. Workspace Design – Arm reach and extremity measures for Industrial Design. Humanising Design – Indian Scenario.			
Module:8	Contemporary issues	2 hours	
Contemporary discussion with the artists and designers.			
Total Lecture hours:		30 hours	
Text Book(s)			
1.	M.S.Sanders and Ernest J McCormick, ‘Human factors in Engineering and Design’, McGraw Hill International Editions, 2013.		
Reference Books			
1.	Karl Kroemer, Henrike Kroemer, Katrin Kroemer-Elbert, “ERGONOMICS” How to Design for Ease & Efficiency, Prentice Hall International Editions, 2001.		
2.	Bridger RS, ‘Introduction to Ergonomics’, 2nd Edition, Taylor & Francis, 2003		
3.	Green, W.S. and Jordan, P. W, Human Factors in Product Design, Taylor & Francis, 1999.		
4.	D. Chakrabarti, Indian Anthropometric Dimensions for ergonomic design practice, National Institute of Design, Ahmedabad, 1997.		
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar			
List of Challenging Experiments (Indicative)			
1.	Anthropometry	6 hours	
2.	Grip Strength – Hand and Pinch	3 hours	
3.	Hand strength and Back strength	3 hours	
4.	RULA & REBA - Posture	6 hours	
5.	Measurement of Environmental Factors	6 hours	
6.	Borg Scale of perceived exertion	3 hours	
7.	NASA TLX	3 hours	
Total Laboratory Hours			30 hours
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council	No. 57	Date	05-12-2019



Course code	ELECTRONICS FOR DESIGNERS	L	T	P	J	C
BDE1005		2	0	2	0	3
Pre-requisite		Syllabus version				
		1				
Course Objectives:						
1. To implement the foundational knowledge of electronics 2. To understand the principles of electronic circuits through experimental learning. 3. Ability to impart electronics knowledge in product designs.						
Expected Course Outcome:						
The students will have, 1. Thorough Knowledge of electric and electronic basics 2. Basic knowledge in electronic components and properties. 3. Understanding circuits and theorems. 4. Knowledge of dynamic circuits. 5. Understanding of the working of semiconductors. 6. Basic knowledge of sensors, actuators, etc.						
Module:1	Introduction to electricity	4 hours				
Electrons, electric current, conductors, insulator; cells & batteries, sources of power – chemical, solar, mains; current, voltage and power, power equations, Direct Current, Alternating Current; electrical circuits, pulses, waves, signals and noise.						
Module:2	Introduction to basic electronic components and properties	4 hours				
Resistance/resistor, capacitance/capacitor, Inductance/inductor, Batteries, voltage and current sources, wires and cables, switches, transducers – potentiometers & temperature sensors, fuses, Ohms law, voltmeters, ammeters						
Module:3	Introduction to Resistive Circuits	4 hours				
Resistive circuits, Kirchoff’s laws, series, parallel, series-parallel circuits, voltage/current dividers, analysis of resistive circuits – node voltage, mesh current, Circuit theorems – Source Transformations, Superposition, Thevenin’s Theorem, Norton’s Equivalent Circuit, Maximum Power Transfer						
Module:4	Introduction to Dynamic Circuits	4 hours				
Energy storage in capacitors/inductors, Series and parallel capacitors/inductors, Linear (First-order) RC, RL Circuits, Response and time constants.						



Module:5	Semiconductors	4 hours
<p>Introduction to Discrete Semiconductors: Single Junction – Diode, Uni-junction Transistor, Multi Junction – Bipolar Transistor, Field Effect Transistor, MOSFET, Thyristors - SCR, Triacs</p> <p>Introduction to Photonic Semiconductors: Light and optics, LEDs, Light detectors – Photo resistive, PN Junction – photodiodes, phototransistors, photodiodes thyristors; Solar Cells,</p>		
Module:6	Introduction to Integrated Circuits	4 hours
<p>Analog - Op-amp, voltage regulator, timer, multiplexer, comparators; Digital - Logic gate, flip flop, shift register, counter, encoder, decoder; Analog to Digital A/D, Digital to Analog D/A Conversions.</p>		
Module:7	Introduction to basic sensors, actuators and motors	4 hours
<p>IR, Light, Touch, Temperature, Reed, Tilt, etc., Linear and rotational actuators, Mechanical actuators, Piezoelectric actuators, etc., DC motor, stepper motor, servo motor, AC motors, Introduction to PCBs</p>		
Module:8	Contemporary issues:	2 hours
<p>Contemporary discussion with industry experts.</p>		
Total Lecture hours:		30 hours
Text Book(s)		
1.	Robert L. Boylestad, Louis Nashelsky, “Electronic Devices and Circuits Theory”, 11e, Pearson India.	
Reference Books		
1.	Charles K. Alexander, Matthew N.O. Sadiku, “Fundamentals of Electric circuits”, McGraw-Hill Higher Education, 2007.	
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar		
List of Challenging Experiments (Indicative)		
1.	Basics of electronics lab I: Identification of components, symbols, values, resistance color code, schematic circuits.	1 hours
2.	Basics of electronics lab II: Getting started with Multimeter, basic tools, breadboard, proto-board, safety.	1 hours
3.	Measuring voltage using batteries & resistances: measuring voltage of battery, resistance value of resistor, connecting resistances in series/parallel, potentiometers, and voltage divider networks.	2 hours
4.	Resistances and capacitors in DC circuits: capacitance value of capacitor, measuring voltage and current in simple circuits, series-parallel circuits, Time-Voltage measurement of RC circuit.	2 hours
5.	Testing of semiconductor devices: diodes, transistors.	2 hours



6.	Basic circuits with diode: voltage reducer, half-wave rectifier, full-wave rectifier, bridge rectifier.	2 hours
7.	Basic circuits with transistor: common-source, common-gate, common-drain.	2 hours
8.	Experiments with transformers and inductors: Transformer testing, electromagnet.	2 hours
9.	Experiments with simple circuits: battery, resistor, capacitor, switches, transistors and LED – simple switching circuit, relay oscillator, transistor switching.	2 hours
10	Experiments with Op-Amps: Summing, Differentiator, Integrator Circuits.	2 hours
11	Experiments using 555 timer IC: Flashing LED, touch switch, audio tones, a stable multi-vibrator circuit.	2 hours
12	Experiments using Logic gate ICs: Truth tables, building AND, OR gates using diodes and resistors.	2 hours
13	Experiments using function generator ICs: Square, triangle & sine wave generator circuits.	2 hours
14	Simple sensor circuits: touch, IR proximity, Automatic light switch.	2 hours
15	Simple actuator and motor circuits.	2 hours
16	Soldering practice.	2 hours
Total Laboratory Hours		30 hours
Mode of assessment:		
Recommended by Board of Studies	12-03-2019	
Approved by Academic Council	No. 54	Date 14-03-2019



Course code	DESIGN HISTORY	L	T	P	J	C
BDE1006		1	2	0	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
To introduce the notion of Design as it evolved through the ages, from pre-historic times to a discipline in its own right.						
Expected Course Outcome:						
The Students will have,						
<ol style="list-style-type: none"> 1. Understand the evolution and History of Design. 2. Knowledge on the contributions of Bauhaus to industrial design. 3. Understanding of Design and its relationships in industrial design. 4. Understanding of designer's contribution to industrial design. 						
Module:1		4 hours				
Evolution of Design as a discipline						
Module:2		4 hours				
History of Industrial Design.						
Module:3		4 hours				
Bauhaus and its impact on society; Contributions of Bauhaus to the field of industrial design						
Module:4		4 hours				
The discoveries and inventions that have changed the world.						
Module:5		4 hours				
Design and its relationship to art, craft and technology.						
Module:6		4 hours				
Design and designers that have made a difference.						
Module:7		4 hours				
Evolution of design and its relationship to the environment.						
Module:8	Contemporary issues:				2 hours	
Contemporary discussion with the artists and designers.						
		Total Lecture hours:	30 hours			
Text Book(s)						
1.	David Raizman; History of Modern Design, Prentice Hall, 2010					



2.	Cross, N; Design Thinking: Understanding How Designers Think and Work, Berg, Oxford, 2011.		
Reference Books			
1.	Journal of Design History, Oxford Journals		
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar			
Mode of assessment:			
Recommended by Board of Studies	03-03-2018		
Approved by Academic Council	No. 49	Date	15-03-2018



Course code	DESIGN AND SOCIETY	L	T	P	J	C
BDE 1007		2	0	0	4	3
Pre-requisite		Syllabus version				
		v. 2				
Course Objectives:						
<p>In this course, the students will learn about:</p> <ol style="list-style-type: none"> 1. Examine how institutions/organizations shape the ways that designs are Produced, Marketed, Understood, Purchased and Used by people across different sections of the society. 2. Explore issues of cross-cultural exchange in design and society. 3. Discuss innovation and change in art and design in relation to modernism, post-modernism, and globalization. 4. Learn about exploration of ideas relating to status of the design and Indian society, cross-cultural needs/requirements. 5. Observe, document and present the relationship between form and meaning, identity, technology, the body, interactions with the audience, and impact digital media in facilitating consumption. 						
Expected Course Outcome:						
<p>Upon Successful completion of this course, students will be able to:</p> <ol style="list-style-type: none"> 1. Identify the key ideas and approaches used in the study of design and society. 2. Apply skills of visual analysis to interpret a broad range of design in relation to its social context. 3. Identify influence and inspiration drawn from cross-cultural interactions in design influencing society. 4. Research and access information about Design history and theory. 5. Present written and oral arguments about the ideas that inform design and its contributions to social needs from a wide range of periods and cultures. 						
Module:1	How design has contributed to addressing this basic human need.	3 hours				
“Sense of Privacy: over human evolution.						
Module:2	Mass production and birth of Industrial Design	6 hours				
Study the “Impact of Industrial Revolution” on human’s consumption evolution.						
Module:3	Modern design influences from allied fields	6 hours				
Implications in late 19 th , 20 th & 21 st Century developments in Art, Architecture and Design changing societies through innovation and technology						
Module:4		6 hours				
Influence of technology as an enabler for society’s towards “accessing global markets for						



consumptions”			
Module:5	Human’s compulsive need to consume more	9 hours	
Reducing lifetime of products and constant need for more materials.			
Module:6	Trashing the world – Sustainable Design	12 hours	
India – Becoming Worlds Waste Dumpyard – What can designers do to mitigate risks?			
Module:7		12 hours	
Turn crisis, challenge into to opportunity? India can lead the way for developing nations			
Module:8	Contemporary issues: Expert Lecture	6 hours	
Making of a responsible designers...are designers accountable at all? To Who, When & How?			
		Total Lecture hours:	60 hours
Text Book(s)			
1.	Papanek, V. (1984), “Design for the Real World”, 2nd Edition, London: Thames & Hudson		
2.	Whitely, Nigel; Design for Society Publisher: Reaktion Books, 1997, ISBN--10: 0948462655 ISBN--13: 978--0948462658, Reprinted 2014		
3.	The Story of Design: From the Paleolithic to the Present Paperback – October 25, 2016 by Charlotte Fiell (Author), Peter Fiell (Author)		
4.	Industrial Design in the Modern Age Hardcover – April 17, 2018 by Penny Sparke (Introduction)		
Reference Books			
1.	Lidwell, W., Holden, K., Butler, J. [Ed] (2003). Universal Principles of Design, Rockport Publishers, USA, Singapore		
2.	Routledge International Handbook of Participatory Design, Routledge Press, 2013		
3.	Sparke, P; Introduction to Design and Culture in the 20th Century, Routledge, 2013		
4.	The Product Ecology: Understanding Social Product Use and Supporting Design Culture <i>Jodi Forlizzi School of Design, Carnegie Mellon University, Pittsburgh, USA – International Journal of Design Vol 2, No 1 (2008)</i>		
5.	Bødker, M., & Browning, D. (2012). Beyond destinations: Exploring tourist technology design spaces through local-tourist interactions. Digital Creativity, 23(3-4), 204-224.		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council	No. 57	Date	05-12-2019



Course code	FORM STUDIES	L	T	P	J	C
BDE1008		0	0	4	4	3
Pre-requisite		Syllabus version				
		V.1				
Course Objectives:						
1. To acquaint students with basics of form generation. 2. Obtain a knowledge of metamorphosis in form designing. 3. Obtain a knowledge and ability to use the appropriate tools to design and develop new forms.						
Expected Course Outcome:						
The students will have, 1. Ability to generate two dimensional rhythms, deformations and patterns in design. 2. Understanding in cognitive, morphological process inherent in applying form analogies for generating three-dimensional design concepts. 3. Ability to design a product of low complexity, relatively simple geometry and which utilizes a commonly available material and communicate the assembly procedure for the developed product. 4. Understanding semantic analysis of hand-held products and similar elements. 5. Ability to carry out syntactic analysis of hand-held products and similar elements. 6. Knowledge on pragmatic analysis of hand-held products and similar elements.						
Module:1		6 hours				
To generate two dimensional rhythms, deformations and patterns in design.						
Module:2		8 hours				
To develop an understanding of the cognitive, morphological process in designing a form.						
Module:3		8 hours				
To design a product of low complexity, relatively simple geometry and which utilizes a commonly available material such as cardboard.						
Module:4		8 hours				
To develop an understanding of the cognitive, morphological process inherent in applying form analogies for generating a product's form.						
Module:5		6 hours				
To carry out semantic analysis of hand-held products and similar elements.						
Module:6		10 hours				
To carry out syntactic analysis of hand-held products and similar elements.						
Module:7		10 hours				



To carry out pragmatic analysis of hand-held products and similar elements.			
Module:8	Contemporary issues:	4 hours	
Contemporary discussion with the artists and designers.			
		Total Lecture hours:	60 hours
Text Book(s)			
1.	Language of Vision, by Gyorgy Kepes and S Giedion , Literary Licensing, LLC (4 August 2012).		
Reference Books			
1.	Elam, Kimberly; Geometry of Design: Studies in Proportion and Composition, Princeton Architectural Press, 2001.		
2.	Bachelard, Gaston; Jolas, Maria (Translator); The Poetics of Space, Publisher: Beacon Press; Reprint edition, 1994.		
Mode of Evaluation: Assignment / FAT / Project / Seminar			
Mode of assessment:			
Recommended by Board of Studies		12-03-2019	
Approved by Academic Council		No. 54	Date 14-03-2019



Course code	PRODUCT DESIGN	L	T	P	J	C
BDE1009		0	0	4	4	3
Pre-requisite		Syllabus version 1.0				
		1				
Course Objectives:						
1. Understanding the user-centered design process 2. Understanding product aesthetics and human factors 3. Understanding holistic approach to problem-solving in product design						
Expected Course Outcome:						
The students will have, 1. Ability to carry out product design through proper observation. 2. Understanding on the cognitive, morphological process inherent in applying form analogies. 3. Understanding the cognitive, morphological process inherent in applying form analogies. 4. Ability to implement holistic design solution and to evaluate the prototype.						
Module:1		6 hours				
Identifying the need /area of product to be designed						
Module:2		8 hours				
Identifying the nature of products through examples- analysis of existing products						
Module:3		8 hours				
Use of analogies to generate product forms						
Module:4		8 hours				
Product design by generative process, by inspiration, by iteration						
Module:5		6 hours				
Use of 'SCAMPER' to generate product design ideas						
Module:6		10 hours				
Use of metaphors to generate product forms						
Module:7		10 hours				
Study of iconic designers and their designs						
Module:8	Contemporary issues:	4 hours				
Discussions on contemporary issues with the designers.						



	Total Lecture hours:	60 hours	
Text Book(s)			
1.	Carma Gorman, "The Industrial Design Reader", Skyhorse Publishing, 2003		
Reference Books			
1.	Ulrich, Karl T, Eppinger, Steven D, 'Product Design and Development', McGraw-Hill, 2004.		
2.	Cagan, Jonathan, Vogel, Craig M, 'Creating breakthrough products: Innovation from product planning to program approval', Financial Times Prentice Hall, 2002.		
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar			
Mode of assessment:			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		No. 57	Date 05-12-2019



Course code	MATERIAL AND PROCESSES - METALS	L	T	P	J	C
BDE1011		2	0	0	4	3
Pre-requisite		Syllabus version				
		Syllabus version 1.0				
Course Objectives:						
<ol style="list-style-type: none"> 1. To understand the nature and qualities of metals. 2. To understand the various processing techniques for achieving desired form and color for newly designed products. 3. To give the fundamental knowledge of metal finishes and understand various properties of metals. 						
Expected Course Outcome:						
The Students will have,						
<ol style="list-style-type: none"> 1. Thorough understanding of metals for designing of products. 2. Ability to analyze various metal products and understand its properties. 3. Knowledge on various metal properties for processes. 4. Understanding on various shaping attributes of metals. 5. Understanding on various joining attributes of metals. 6. Knowledge on various qualities of metals for surface finishing. 						
Module:1		4 hours				
Role of science and technology, life of a metal, and materials in the design processes.						
Module:2		4 hours				
Classification of metals, Mechanical attributes, Tactile, visual, acoustic attributes of materials.						
Module:3		4 hours				
Process of metal selection for product design. Adoption of new metals.						
Module:4		4 hours				
Metal profiles with technical, eco, and aesthetic attributes.						
Module:5		4 hours				
Metals based on attributes of shaping profiles. (Competing processes, typical products, and environment.)						
Module:6		4 hours				
Metals based on attributes of joining profiles. (Welding, Adhesives, fasteners, etc.,)						



Module:7			4 hours
Metals based on attributes of surface finishing. (Plating, Printing, polishing, coating, etc.,)			
Module:8	Contemporary issues:		2 hours
Contemporary discussions with industrial experts and designers.			
	Total Lecture hours:	30 hours	
Text Book(s)			
1.	Ashby, Michael, Johnson, Kara, 'Materials and Design: The Art and Science of Material Selection in Product Design', Butterworth-Heinemann, 2002.		
Reference Books			
1.	Thompson R, 'Manufacturing process for design professionals', Thames and Hudson, London, 2007.		
2.	Garratt J, 'Design and Technology', Cambridge University Press, UK, 2004.		
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar			
Mode of assessment:			
Recommended by Board of Studies	12-03-2019		
Approved by Academic Council	No. 54	Date	14-03-2019



Course code	MATERIAL AND PROCESSES - NON-METALS	L	T	P	J	C
BDE1013		2	0	0	4	3
Pre-requisite		Syllabus version				
		1.0				
Course Objectives:						
1. To understand the nature and qualities of non-metals. 2. To understand the various processing techniques for achieving desired form and color for newly designed products. 3. To give the fundamental knowledge of non-metal finishes and understand various properties of non-metals.						
Expected Course Outcome:						
The Students will have, 1. Thorough understanding of non-metals for designing of products. 2. Ability to analyze various non-metal products and understand its properties. 3. Knowledge on various non-metal properties for processes. 4. Understanding on various shaping attributes of non-metals. 5. Understanding on various joining attributes of non-metals 6. Knowledge on various qualities of non-metals for surface finishing.						
Module:1		4 hours				
Material evolution and materials in the design process.						
Module:2		4 hours				
Classification of non-metals, Elastic modulus and density. Tactile, visual, acoustic attributes of materials.						
Module:3		4 hours				
Process of non-metals selection for product design. Adoption of new materials.						
Module:4		4 hours				
Non-Metal profiles with technical, eco, and aesthetic attributes.						
Module:5		4 hours				
Non-Metals based on attributes of shaping profiles. (Competing processes, typical products, and environment.)						



Module:6		4 hours
Non-Metals based on attributes of joining profiles. (Adhesives, fasteners, etc.,)		
Module:7		4 hours
Metals based on attributes of surface finishing. (Printing, polishing, coating, etc.,)		
Module:8		2 hours
Contemporary discussion with industrial experts and designers.		
	Total Lecture hours:	30 hours
Text Book(s)		
1.	Ashby, Michael, Johnson, Kara, 'Materials and Design: The Art and Science of Material Selection in Product Design', Butterworth-Heinemann, 2002.	
Reference Books		
1.	Thompson R, 'Manufacturing process for design professionals', Thames and Hudson, London, 2007.	
2.	Garratt J, 'Design and Technology', Cambridge University Press, UK, 2004.	
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar		
Mode of assessment:		
Recommended by Board of Studies	12-03-2019	
Approved by Academic Council	No. 54	Date 14-03-2019



Course code	ADVANCED IMAGE REPRESENTATION TECHNIQUES	L	T	P	J	C
BDE2001		0	0	4	4	3
Pre-requisite		Syllabus version				
		v.1.0				
Course Objectives:						
4. Understanding the representation principles and applying to various projects 5. Ability to Make imagery through memory and imagination 6. Ability to do image manipulation and form high fidelity renderings						
Expected Course Outcome:						
The students will have,						
1. Ability to generate and represent concepts through sketching 2. Understanding on mimic Imagery and abstraction through memory and imagination. 3. Ability to express Image through various set time and space using Image manipulation techniques. 4. Ability to express colour form and structure through Image making software						
Module:1		6 hours				
Representing the observed and Representing concepts - Sketching for ideation						
Module:2		8 hours				
Mimetic Imagery and Abstraction & Memory and Imagination						
Module:3		8 hours				
History of Art and Aesthetics						
Module:4		8 hours				
Expression and Imagery & Time and Space in Image						
Module:5		6 hours				
Migration of forms and Image manipulation						
Module:6		10 hours				
Metamorphosis through form, colour and structure						
Module:7		10 hours				
Advanced exposure and demonstration to Illustration and Image making software						
Module:8	Contemporary issues:	4 hours				
Contemporary discussion with the artists and designers.						
Total Lecture hours:		60 hours				



Text Book(s)			
1.	McKim, Robert; Experiences in Visual Thinking, Publisher Brooks/Cole Publishing Company, 1980		
2.	Missal, Stephen; Exploring Drawing for Animation (Design Exploration Series), Thomson Delmar Learning, 2003		
Reference Books			
1.	D. K. Francis Ching; Design Drawing, John Wiley & Sons, 1998		
2.	Porter, Tom; Design Drawing techniques for architects, graphic designers and artists, Oxford; Architectural Press, 1991		
3.	Dalley Terence ed.; The complete guide to illustration & design, Phaidon, Oxford, 1980		
4.	T. C. Wang; Pencil Sketching, John Wiley & Sons, 1997		
5.	Caplin, Steve; Banks, Adam; The Complete Guide to Digital Illustration Publisher: Watson-Guptill Publications, 2003		
6.	Arnheim, Rudolph; Visual Thinking: University of California Press 2004		
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar			
Mode of assessment:			
Recommended by Board of Studies	03-03-2018		
Approved by Academic Council	No. 49	Date	15-03-2018



BDE2002	DESIGN FUNDAMENTALS – 3D	L	T	P	J	C
Pre-requisite		0	0	4	4	3
Anti requisite		Syllabus version				
		v. 1				
Course Objectives:						
<ol style="list-style-type: none"> 1. Understanding the fundamentals of 3-dimensional design. 2. Understanding the elements of design for 3-dimension. 3. Obtain a knowledge and ability to use the appropriate tools to design and develop new forms for required products. 						
Expected Course Outcome:						
The students will have,						
<ol style="list-style-type: none"> 1. Ability to generate rhythms, deformations and patterns in forms. 2. Understanding in cognitive, morphological process inherent in applying shape analogies for generating three-dimensional design concepts. 3. Ability to design a composition of low complexity and with relatively simple geometry. 4. Understanding to carry out semantic analysis of visual elements. 						
Module:1		6 hours				
Understanding the various elements and principles of art and design in 3D.						
Module:2		8 hours				
Expressions and explorations using volumes and its relation in context to nature and environment.						
Module:3		8 hours				
Study and understanding the form transition and morphology.						
Module:4		8 hours				
Principles of colour theory and explorations on the forms.						
Module:5		10 hours				
Exposure to form and movement						
Module:6		10 hours				
Visual relationships – Balance, proportion, order, symmetry, rhythm, etc.,						
Module:7		4 hours				
Concept form development using different mediums.						
Module:8	Contemporary issues:				4 hours	
Contemporary discussion with the artists and designers.						
	Total Lecture hours:	60 hours				
Text Book(s)						



1.	Kepes, Gyorgy; Language Of Vision, Dover Publications, 1995		
2.	Elam, Kimberly; Geometry Of Design: Studies In Proportion And Composition, Princeton Architectural Press, 2001		
3.	Bachelard, Gaston; Jolas, Maria (Translator); The Poetics Of Space, Publisher: Beacon Press; Reprint edition, 1994		
Reference Books			
1.	Hannah, Gail Greet; Elements Of Design, Princeton Architectural Press, 2002		
Mode of Evaluation: Assignment / FAT / Project / Seminar			
Mode of assessment:			
Recommended by Board of Studies		03-03-2018	
Approved by Academic Council		No. 49	Date 15-03-2018



Course code	DESIGN STUDIO – PROBLEM ANALYSIS	L	T	P	J	C
BDE2003		0	0	4	4	3
Pre-requisite		Syllabus version				
		V.1				
Course Objectives:						
<ol style="list-style-type: none"> 1.To understand the different problem analyzing techniques 2.To understand various mind mapping techniques 3.To develop new products using various design methodologies 						
Expected Course Outcome:						
<p>The students will have,</p> <ol style="list-style-type: none"> 1. Creating ability for affinity mapping and Temporal spatial mapping on an existing idea. 2. Ability to do Mind mapping. 3. Knowledge on Sensory and Cognitive mapping. 4. Ability to develop new product through semiotic analysis. 						
Module:1		6 hours				
Affinity mapping on an existing idea/concept/product/system						
Module:2		8 hours				
Temporal spatial mapping on an existing idea/concept/product/system						
Module:3		8 hours				
Mind mapping on an existing idea/concept/product/system						
Module:4		8 hours				
Sensory mapping on an existing idea/concept/product/system						
Module:5		6 hours				
Cognitive mappings on an existing idea/concept/product/system						
Module:6		10 hours				
Semiotic analysis on an existing idea/concept/product/system						
Module:7		10 hours				
Opportunity for a new development of product/system/service						
Module:8	Contemporary issues:					4 hours
Contemporary discussion with the artists and designers.						
		Total Lecture hours:	60 hours			
Text Book(s)						
1.	Ulrich, Karl T., Eppinger, Steven D.; Product Design and Development, McGraw-Hill, 5 th edition (May 5, 2011)					



Reference Books			
1.	Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions By Bruce Hanington. Rockport Publishers; 58480th edition (February 1, 2012)		
2.	Delft Design Guide: Design Strategies and Methods. BIS Publishers (April 1, 2014)		
Mode of Evaluation: Assignment / FAT / Project / Seminar			
Mode of assessment:			
Recommended by Board of Studies	09-12-2018		
Approved by Academic Council	No. 53	Date	13-12-2018



Course code	SMART PRODUCT DESIGN	L	T	P	J	C
BDE3002		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
1. Understanding the user-centred design process. 2. Understanding the trend and play along with the new evolved product design.						
Expected Course Outcome:						
1. Understanding the evolution of smart products. 2. Ability to generate design concepts using smart product components. 3. Understanding the smart eco system. 4. Ability to integrate IOT in new products and to evaluate the prototype.						
Module:1		6 hours				
Smart Product history and evolution.						
Module:2		8 hours				
Familiarizing smart product components -1						
Module:3		8 hours				
Familiarizing smart product components - 2						
Module:4		6 hours				
Electronic programming – 1						
Module:5		6 hours				
Electronic programming – 2						
Module:6		10 hours				
Introduction to smart product eco-system.						
Module:7		10 hours				
Integration of IOT in products.						
Module:8	Contemporary issues:	4 hours				
Contemporary discussion with the artists and designers.						
	Total Lecture hours:	60 hours				
Text Book(s)						
1.	Smart Product Design, Hardcover – August 1, 2017, Send points Publishing Co ltd					
Reference Books						
1.	Smart things, Ubiquitous Computing User Experience Design , Mike Kuniavsky					
Mode of Evaluation: Assignment / FAT / Project / Seminar						
Recommended by Board of Studies		24-09-2020				
Approved by Academic Council		No. 59	Date	24-09-2020		



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SYLLABUS FOR
PROGRAM ELECTIVE
COURSES



Course code	Computer Modelling and Simulation Techniques	L	T	P	J	C
BDE 1010		0	0	4	4	3
Pre-requisite		Syllabus version				
		V.1.0				
Course Objectives:						
The students will be able to, <ol style="list-style-type: none"> 1. Work on digital expression of industrial design. 2. Use digital mediums for 2D and 3D modelling. 3. Render and create high quality photo realistic simulation of products 						
Expected Course Outcome:						
The students will have ability to, <ol style="list-style-type: none"> 1. Develop and edit digital representational inputs. 2. Understand 3D digital modelling tools and techniques. 3. Learn to use different digital mediums for product modelling. 						
Module:1		2 hours				
Introduction to 2D and 3D digital tools – History and software evolution.						
Module:2		6 hours				
3D modelling – Perspective and orthographic views.						
Module:3		6 hours				
Understanding the basic principles and methods of 3D modelling.						
Module:4		6 hours				
Exercises on creating basic geometric forms.						
Module:5		16 hours				
Exercises on part modelling.						



Module:6		12 hours	
3D modelling - Exercises on part modelling and assembly.			
Module:7		10 hours	
3D modelling and simulation – exercises on simulations.			
Module:8		2 hours	
Contemporary discussions with industrial experts and designers.			
	Total Lecture hours:	60 hours	
Text Book(s)			
1.	Modeling and Simulation Paperback – 2012 by <u>Pushpa Singh</u> (Author), <u>Narendra Singh</u> (Author)		
Reference Books			
1.	Modeling and Simulation using MATLAB - Simulink, 2ed Paperback – 2015 by <u>Shailendra Jain</u>		
2.	SOLIDWORKS 2019 Learn by doing: Sketching, Part Modeling, Assembly, Drawings, Sheet metal, Surface Design, Mold Tools, Weldments, MBD Dimensions, and Rendering – 2019		
3.	Autodesk Fusion 360 For Beginners: Part Modeling, Assemblies, and Drawings - 2019		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		No. 57	Date 5-12-2019



Course code	GRAPHIC DESIGN	L	T	P	J	C
BDE1012		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 01.01				
Course Objectives:						
In this course, the students will learn about:						
<ol style="list-style-type: none"> 1. Define Principles, Elements of visual design influencing product aesthetics. 2. Explore different aspects of product drawings and representation techniques using multiple mediums for presentations. 3. Understand classification and types of products design 4. Analyze different product categories (tangible & virtual) with respect to their interface design (Display and Controls) as Human Machine Interface (HMI). 						
Expected Course Outcome:						
At the end of this course students will be able to:						
<ol style="list-style-type: none"> 1. Explain the Principles and Elements of Visual Design with reference to product design 2. Experiment with Media Explorations of Product sketching/rendering suitable for presentation. 3. Define, Identify and Build graphic elements in product design 4. Demonstrate application of Product interface design to propose design enhancement on existing products/propose new product designs with interaction interfaces. 						
Module:1		2 hours				
Concept of visual language and visual design						
Module:2		1 hours				
Fundamentals of Interaction - Hierarchy of Functions, Placement & Sequencing,						
Module:3		1 hours				
Nomenclature (Labeling) & Icon Design, Readability - Semantics						
Module:4		2 hours				
Introduction to typography and fonts applied in tangible product designs						
Module:5	Learning to make product illustrations using different techniques & mediums	12 hours				
Module:6		12 hours				
Introduction to object drawing (Freehand, Isometric, Axonometric and Orthographic projections)						
Module:7		9 hours				
Theory of perspective, one point, two point perspective and three point perspective						



Module:8		2 hours
Importance of Product Graphics through Case studies		
Module:9		2 hours
Product Attributes Function and Emotion		
Module:10		3 hours
Product Configurations and Component relationships (Component Matrix)		
Module:10		2 hours
Product as abstractions – Design Inspirations		
Module:11		6 hours
Investigations and study of visual, functional and ergonomic requirements of control and display interfaces.		
Module:12		6 hours
Color, Form and Texture – Exploring Emotions and Sensibilities		
	Total Lab hours:	60 hours
Text Book(s)		
1.	Design Basics, From Ideas to Products by Gerhard Heufler , 2004	
2.	The Elements of Graphic Design / Edition 2 by Alex W. White ISBN-10: 1581157622, ISBN-13: 9781581157628, Pub. Date: 03/15/2011 Publisher: Allworth	
3.	Design Rendering Techniques: A Guide to Drawing and Presenting Design Ideas by Dick Powell Published by North light (first published January 1986) ISBN 0891341250 (ISBN13: 9780891341253)	
4.	Isometric / 3D Grid Notebook - 1/4" Discreet Grid Design - Sequentially Numbered - Graph Paper Journal: Architectural, Interior & Industrial Design, 3D Maps and Engineering - BLUE: Inventions Paperback – December 27, 2018 by Createmplative (Author), Joseph Christensen (Contributor)	
5.	Design Sketching Published by Erik Olofsson and Klara Sjöln (2006) ISBN: 9197680702 (ISBN13: 9789197680707)	
6.	Graphic Design: A Concise History, Second Edition (World of Art) Paperback – June, 2002 by Richard Hollis , Publisher: Thames & Hudson; Second edition (June 2002) ISBN-10: 0500203474 ISBN-13: 978-0500203477	
7.	Learning Curves: An Inspiring Guide to Improve Your Design Sketch Skills by Klara Sjöln , Allan Macdonald , Published by KEEOS Design Books, 2011, ISBN 9163389525, 9789163389528	
8.	Carl Liu's Design Book BY Chuan-kai (Carl) Liu, Published by Long Sea International Book,	



	2004, ISBN 9579437831, 9789579437837		
9.	How to Think Like a Great Graphic Designer Paperback by <u>Debbie Millman</u> , Published by Skyhorse Publishing Inc., 2007 ISBN 1581154968, 9781581154962		
10.	Sketching: Drawing Techniques for Product Designers by Koos Eissen and Roselien Steur. Published by Laurence King Publishing, 2019 ISBN 9063695330, 9789063695330		
11.	Sketching, Product Design Presentation Authors <u>Koos Eissen</u> , <u>Roselien Steur</u> , Publisher Laurence King Publishing, 2014 ISBN 906369329X, 9789063693299		
12.	Sketching: The Basics by <u>Koos Eissen</u> , <u>Roselien Steur</u> , Published by BIS, 2011, 9063692536, 9789063692537		
13.	Drawing for Product Designers by <u>Kevin Henry</u> Published by Laurence King Publishing, 2012 ISBN 1856697436, 9781856697439		
14.	Perspective Sketching: Freehand and Digital Drawing Techniques for Artists & Designers BY <u>Jorge Paricio</u> Rockport Publishers, 2015 ISBN 1631590324, 9781631590320		
Reference Books			
1.	Understanding Industrial Design: Principles for UX and Interaction Design 1st Edition by <u>Simon King</u> (Author), <u>Kuen Chang</u> (Author) O'Reilly Media, Inc.", 2016 ISBN 149192036X, 9781491920367		
2.	Everyday Modern: The Industrial Design of Alfonso Iannelli by David Jameson (2015) Paperback Published by Bronze Man Books ASIN: B019NEKP6W		
3.	Materials and Design, Third Edition, The Art and Science of Material Selection in Product Design, <u>Michael F. Ashby</u> , <u>Kara Johnson</u> 2014		
4.	Concept Design Books by Scott Robertson Published by Titan Books Limited, 2006 ISBN 184576286X, 9781845762865		
5.	Presentation Techniques by Dick Powell Published by North Light Books, 1986 ISBN 0891341250, 9780891341253		
6.	Analog Dreams by Michale DiTullo Published by Blurb, 2010 ISBN 1389285448, 9781389285448		
Mode of Evaluation: CAT / Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		No. 57	Date 05-12-2019



Course code	CREATIVE EXPLORATION TECHNIQUES	L	T	P	J	C
BDE1014		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 01.00				
Course Objectives:						
In this course, the students will learn about:						
<ol style="list-style-type: none"> 1. Define creativity and State conditions when an idea become Innovation - Cognitive issues in creative thinking 2. Explain Left brain & Right Brain thinking - Neurobiological studies of human brain lateralization with respect of creative thinking phenomena 3. Explore ways of Thinking Introduction to knowledge engineering and management, Modelling of Design Thinking and Tacit knowledge representation, Fuzzy thinking, vertical thinking, lateral thinking 4. Understand Convergent and Divergent Thinking Tools and Techniques to generate ideas 5. Role of creativity in Innovation and Invention; Comparative studies of creativity in the Arts, Sciences, Engineering and Design, Design Futures: Future casting, Case Studies 6. What, When, Where, Which, Who & Why: Introduction to Intellectual Property Rights. 						
Expected Course Outcome:						
At the end of this course, the students will be able to:						
<ol style="list-style-type: none"> 1. Explain cognitive issues in creative thinking 2. Describe the working of a human brain while generating ideas 3. Define knowledge engineering and management and Summarise types of creative thinking 4. Demonstrate generation of ideas using different tools and techniques for a given context 5. Compare and classify creativity in Innovation and Invention the Arts, Sciences, Engineering and Design. 6. Analyze and Present: Select a case study of a design application for Intellectual Property Rights 						
Module:1		3 hours				
Cognitive issues in creative thinking						
Module:2		3 hours				
Neurobiological studies of human brain lateralization with respect of creative thinking phenomena.						
Module:3		3 hours				
Introduction to knowledge engineering and management						
Module:4		6 hours				
Modelling of Design Thinking and Tacit knowledge representation						
Module:5		9 hours				



Fuzzy thinking, vertical thinking, lateral thinking.		
Module:6		12 hours
Convergent and Divergent Thinking – Familiarise with Tools and Techniques to generate ideas		
Module:7		10 hours
Role of creativity in Innovation and Invention: Comparative studies of creativity in the Arts, Sciences, Engineering and Design		
Module:8		9 hours
Design Futures : Future casting, Case Studies		
Module:9		3 hours
Issues in Intellectual Property Rights - Select a case study of a design application for Intellectual Property Rights.		
Total Lab hours:		60 hours
Text Book(s)		
1.	Lateral Thinking, by Bono Edward De Publisher: Penguin UK (2 March 2010) ISBN-10: 0141033088 ISBN-13: 978-0141033082	
2.	Serious Creativity - How to be creative under pressure and turn ideas into action, Edward de Bono, Penguin books Published: 05/03/2015 ISBN: 9780091939700	
3.	Crash Course in Creativity (Crash Course (Stylus)) by <u>Brian Clegg</u> (Author), <u>Paul Birch</u> (Author), Kogan Page Business Books (September 2004)	
4.	The Big Book of Creativity Games: Quick, Fun Activities for Jumpstarting Innovation, by <u>Robert Epstein</u> (Author) McGraw-Hill Education; 1 edition (August 17, 2000).	
5.	Creating Breakthrough Products: Revealing the Secrets that Drive Global Innovation 2013, by Jonathan Cagan and Craig M. Vogel.	
6.	Creative Like da Vinci: Practical Everyday Creativity for Idea Generation, New Perspectives, and Innovative Thinking Paperback – October 18, 2018 by <u>Peter Hollins</u> Publisher: Independently published (October 18, 2018) ISBN-10: 1728935938 ISBN-13: 978-1728935935	
7.	Teaching Creative Thinking: Developing learners who generate ideas and can think critically (Pedagogy for a Changing World) Paperback – December 19, 2017 by <u>Bill Lucas</u> (Author), <u>Ellen Spencer</u> (Author), Publisher: Crown House Publishing (December 19, 2017) ISBN-10: 1785832360 ISBN-13: 978-1785832369	
8.	Developing Creative Thinking in Beginning Design <u>Stephen Temple</u> Sep 26, 2018 Publisher: Routledge; 1 edition (September 20, 2018) ISBN-10: 1138654868 ISBN-13: 978-1138654860	



9.	Developing Creativity in the Classroom, <u>Todd Kettler Ph.D</u> , <u>Kristen N. Lamb</u> , <u>Dianna R. Mullet, Ph.D</u> Dec 1, 2018 Publisher: Prufrock Press (December 1, 2018) ISBN-10: 1618218042 ISBN-13: 978-1618218049		
10.	S. D. Savransky, Engineering of Creativity – Introduction to TRIZ method of inventive problem solving, CRC Press, 2000		
Reference Books			
1.	M. Runio and S. Pritzker (eds.), Encyclopedia of Creativity, Academic Press, 1999.		
2.	G. Schreiber, H. Akkermans, A. Anjewierden, R. de Hoog, N. Shadbolt, W. Van de Velde and B. Wielinga, Knowledge Engineering and Management, MIT Universities Press India Ltd, 2000.		
3.			
4.	E. De Bono, Serious Creativity, INDUS Harper Collins Publishers India, 1992.		
5.	D. Morey, M. Maybury and B. Thuraisingham, Knowledge Management, Universities Press MIT, 2000		
Mode of Evaluation: Assignment / FAT / Project			
Mode of evaluation:			
Recommended by Board of Studies	27-11-2019		
Approved by Academic Council	No. 57	Date	05-12-2019



Course code	PRODUCT DETAILING AND MECHANISMS	L	T	P	J	C
BDE1015		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
<p>The students will be able to,</p> <ol style="list-style-type: none"> 1. Understand the fundamentals of products detailing. 2. Understand the Basic mechanisms of product parts. 3. Assemble the parts with relevant assembling techniques. 4. Design products using different types of mechanisms. 						
Expected Course Outcome:						
<p>The students will have,</p> <ol style="list-style-type: none"> 1. Ability to generate parts using modelling techniques. 2. Create reverse engineering of a given component.. 3. Ability to make assembly drawings of the models. 4. Understanding to make draft for mould manufacturing. 5. Ability to use rapid manufacturing techniques to create prototype. 						
Module:1		4 hours				
Introduction - Detailing in plastic products.						
Module:2		4 hours				
Detailing in mechanisms – Gears and gear trains, Belt and Chain drives, Cam and Followers, and Linkages.						
Module:3		4 hours				
Design detailing for fabricated products in sheet metal, steel tubes, angles, aluminum sheets and extruded sections.						
Module:4		8 hours				
Detailing while using fabric materials - foam and other cushions, leather and cloth in combination with materials like wood and metal.						



Module:5		8 hours	
Design detailing for wood products in soft wood, hard wood and man-made wood.			
Module:6		12 hours	
Disassemble and assembling of specific products, and identify the details like materials, joineries, fits, mechanisms and assembly techniques.			
Module:7		16 hours	
Re-design the selected products and propose new design with alternative materials, joineries, fits and mechanisms (Working prototype)			
Module:8		4 hours	
Contemporary discussions with industrial experts and designers.			
	Total Lecture hours:	60 hours	
Text Book(s)			
1.	Robert A. Malloy, Plastic Part Design for Injection Molding, Hanser Publication, 2010		
Reference Books			
1.	507 Mechanical Movements: Mechanisms and Devices (Dover Science Books) Paperback – 15 Aug 2005 – Author-Henry T Brown		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		No. 57	Date 05-12-2019



Course code	Collaborative Design Project	L	T	P	J	C
BDE1016		0	0	0	12	3
Pre-requisite	Completion of minimum of Two semesters	Syllabus version				
		v. 1.0				
Course Objectives:						
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. This course is open to interested B tech students to encourage collaboration among cross- disciples.						
Expected Course Outcome:						
At the end of the course the student should be able to: 1. Work as a team solving a relatively complex design problem 2. Develop the ability to engage in research and to involve in life-long learning. 3. Comprehend contemporary issues. 4. Take up a common problem and solve it as a group with collaborative efforts.						
Contents						
The students will take up a common problem and solve it as a group with collaborative efforts.						
Mode of Evaluation: Internship Report, Presentation and Project Review						
Recommended by Board of Studies	24-09-2020					
Approved by Academic Council	61	Date	18-02-2021			



Course code	RE-DESIGN PROJECT	L	T	P	J	C
BDE1017		0	0	0	8	2
Pre-requisite	Completion of minimum of Two semesters	Syllabus version				
		v. 1.0				
Course Objectives:						
Re-design project would allow for students to apply his/her learning until now in identifying problems to solve in an existing solution and redesign it by following a design process and come out with innovative and appropriate solutions.						
Expected Course Outcome:						
At the end of the course the student should be able to:						
<ol style="list-style-type: none"> 1. Develop the ability to engage in research and to involve in life-long learning. 2. Comprehend contemporary issues. 3. Take up a common problem and solve it following the design process. 						
Contents						
<ul style="list-style-type: none"> • An independent student project based on student inclination and interest. • This project allows students to identify a problem to solve and then address different issues pertaining to various segments under different contexts and environments. • The project also encourages students to adopt appropriate design process and methods to solve the chosen problem. 						
Mode of Evaluation: Internship Report, Presentation and Project Review						
Recommended by Board of Studies		24-09-2020				
Approved by Academic Council		59	Date	24-09-2020		



Course code	POTTERY	L	T	P	J	C
BDE1018		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.00				
Course Objectives:						
1. To acquaint students with basics of pottery. 2. Obtain a knowledge on various hand tools and hand building techniques using clay. 3. Obtain a knowledge and ability to use the appropriate construction techniques to design using clay.						
Expected Course Outcome:						
1. Ability to successfully manipulate clay through the basic hand building techniques of coil, pinch, and slab 2. Apply skills to manipulate clay on the potters wheel (wheel throwing) 3. Ability to embellish the surface in an expressive and meaningful way using slips. 4. Thorough understanding of Bisqueting and Glazing 5. Ability to discuss, in an articulate, thoughtful manner during class critiques, the meaning, design, and technical processes used to create ceramic art objects 6. Ability to produce decorative and functional ceramic pieces.						
Module:1		6 hours				
Introduction to three hand building techniques Pinch, coil and Slab						
Module:2		8 hours				
Introduction to various drying stages of clay and various firing stages of clay Greenware, Bisqueware, Glazeware etc						
Module:3		8 hours				
Exercises on Sculpting with clay using hand tools and joining methods						
Module:4		8 hours				
Exercise on Slab, Pinching and Coiling						
Module:5		6 hours				
Introduction to potter's wheel and wheel throwing.						
Module:6		10 hours				
Exercise on Bisqueting						
Module:7		10 hours				



Exercise on Glazing			
Module:8	Contemporary issues:	4 hours	
Contemporary discussion with the artists and designers.			
		Total Lab hours:	60 hours
Text Book(s)			
1.	Sunshine Cobb; Mastering Hand Building: Techniques, Tips and Tricks for Slabs, Coils, and More , 2018		
Reference Books			
1.	Ben Carter; Mastering the Potter's Wheel: Techniques, Tips, and Tricks for Potters		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		57	Date 05-12-2019



Course code	CARPENTRY	L	T	P	J	C
BDE1019		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.00				
Course Objectives:						
1. Understand and apply proper safety practices to the woodworking workshop. 2. Ability to safely use non-powered woodworking tools. 3. Ability to safely use portable and stationary power tools 4. Ability to work with various wood materials						
Expected Course Outcome:						
1. Acquire practical skills in wood cutting, joining and other allied operations. 2. Apply knowledge and practical skills in engineering measurements. 3. Acquire experience in preventive and corrective maintenance of various cutting tools, machine tools and equipment 4. Ability to do various kinds of work and working procedures. 5. Apply skills to work with various joints and perform finishing work.						
Module:1		6 hours				
Introduction to Carpentry: Safety Training, Relationship between timber, Tools and Carpentry.						
Module:2		8 hours				
Carpentry Tools Classification of Tools, Measuring and Marking, Holding, Cutting, Grooving, Planing, Striking, Boring and Miscellaneous Tools, Care and maintenance of Tools, Precautions to be taken while using carpentry tools, Sharpening tools, Wood working machines, Wood working lathe, Wood sawing machine, etc.						
Module:3		8 hours				
Basic Drawing and Calculations: Instruments for drawing, Preliminary practice, Different methods, Orthographic drawing, Isometric drawing, Oblique drawing, Perspective drawing, Freehand drawing or sketching. Units of measurement, How to measure and calculate, Examples on Calculations.						
Module:4		8 hours				
Types of Work and Working Procedure: Marking, Sawing, Planing, Chiselling, Boring, Striking, Checking, Sharpening						
Module:5		6 hours				
Joints in Carpentry work: Lengthening/Widening Joints, Corner Joints, Framing Joints, Preparation of timber and making joint, Precautions in making a joint.						
Module:6		10 hours				
Working with Nails, Screws and Other Materials: Nails, Screws, Dowels, Bolts and Nuts,						



Glue; Types of Glue, (Casein Glue, Animal Glue, Vegetable Glue, Synthetic resin)			
Module:7			10 hours
Finishing Work: Classification, Stains and Preservations, Wood filling, Polishing, Paints			
Module:8	Contemporary issues:		4 hours
Contemporary discussion with the artists and designers.			
		Total Lab hours:	60 hours
Text Book(s)			
1.	Colin Eden-Eadon and DK; Woodwork: A Step-by-Step Photographic Guide,2010		
2.	Peter Korn; Woodworking Basics, 2003		
Reference Books			
1.	Terrie Noll; The Joint Book: The Complete Guide to Wood Joinery, 2002		
2.	Bob Flexner; Understanding Wood Finishing, 1994		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		57	Date 05-12-2019



Course code	DESIGN THINKING	L	T	P	J	C
BDE1020		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
<p>In this course, the student will learn about: What design thinking is and when to use it</p> <ul style="list-style-type: none"> • How to prepare to see and take action when opportunity arises – Problem/Opportunity identification, develop sound hypotheses, collect and analyse appropriate data, and develop ways to collect meaningful feedback in a real-world environment • Familiarize with different Design Thinking Frameworks • Need to be Empathetic, Empathy mapping and rapport building to understand and seek clarity on the identified issue • How to use design thinking to generate innovative ideas (Convergent & Divergent Thinking) • How to take the many ideas generated and determine which ones are likely to produce specific, desired outcomes • Translate broadly defined opportunities into actionable innovation possibilities and recommendations for key stakeholders through drawings, models and concise comprehensive presentation. • Apply compelling communication strategies (diagramming and storytelling) for final presentation of designed solutions with emphasis on Design Thinking process. 						
Expected Course Outcome:						
<p>At the end of this course, the students will:</p> <ol style="list-style-type: none"> 1. Apply the theory of Design Thinking to public design challenges. 2. Use their skills and knowledge to identify and communicate public concerns from the perspective of those living in the communities along the Green Line. 3. Have a deep understanding with empathy of community members and their underlying needs and values-- especially those typically under-represented in current approaches--by having engaged community members through a variety of methods (interviews, photography, diagramming, personal experiences, recordings, self-documentation, writing). 4. Collaborate with other students who have varied perspectives and areas of expertise to formulate and prioritize community concerns and provide opportunities for change. 5. Ability to generate ideas using Creative thinking tools and techniques. 6. Seek consultation from and establish collaborations with members and leaders of various communities, organizations, and agencies to develop innovative approaches to community engagement, problem- seeking (and reframing), and problem-solving in local communities. 7. Create compelling narratives and presentations through visual communication and storytelling. 						
Module:1	What design thinking is and when to use it	3 hours				
<ul style="list-style-type: none"> • Introduction to Design Thinking, its systematic application using Design Process in a context. 						
Module:2	How to prepare to see and take action when opportunity arises	9 hours				
<ul style="list-style-type: none"> • How to prepare to see and take action when opportunity arises – Problem/Opportunity 						



<p>identification, develop sound hypotheses, collect and analyze appropriate data, and develop ways to collect meaningful feedback in a real-world environment.</p> <ul style="list-style-type: none"> Ranking of problem statements 		
Module:3	Familiarize with different Design Thinking Frameworks	6 hours
<ul style="list-style-type: none"> Familiarize with different Design Thinking Frameworks Create list of problem statements for selecting to work on 		
Module:4	Need to be Empathetic	9 hours
<ul style="list-style-type: none"> “Empathy” work , plan and responsibilities Reflection 1 - Project presentations and review Reframe the problem statement based on analysis and feedback 		
Module:5	How to use design thinking to generate innovative ideas	3 hours
<ul style="list-style-type: none"> Ideation using Creative tools and techniques – Make Sketches, Drawing of ideas explorations identify possible relevant ideas to create proposed ideas as presentable renderings to finalise 		
Module:6	How to determine which ideas are likely to produce specific, desired outcomes	12 hours
<ul style="list-style-type: none"> Reflection 2 - Project ideas presentations and review 		
Module:7	Develop designs and evaluate its effectiveness	9 hours
<ul style="list-style-type: none"> Evaluate the effectiveness of final proposed solution with target audience and document scope of improvement based on user feedback. Incorporate the suggested enhancement in the final solution. 		
Module:8	Final presentation for course evaluation	15 hours
<ul style="list-style-type: none"> Make detailed comprehensive design document consisting of the entire Design thinking process. Presentation needs to be supported with artefacts (sketch books, project diary, charts & flow diagrams, models/prototypes) as Final project submission for evaluation 		
Total Course hours:		60 hours
Text Book(s)		
1.	Bruce Hannington and Bella Martin, Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions (Rockport Publishers, 2012)	
2.	Don Norman, The Design of Everyday Things (Basic Books, 2013)	
	• Dan Roam, The Back of the Napkin (Expanded Edition): Solving Problems and Selling Ideas With Pictures (Portfolio, 2013)	
3.	IDEO.org, The Field Guide to Human Centered Design (IDEO.org, 2015)	
4.	Jeanne Liedtka and Tim Ogilvie Designing for Growth: A Design Thinking Tool Kit for Managers (Columbia University Press, 2011)	



5.	Jeanne Liedtka, Tim Ogilvie, and Rachel Brozenske, <i>The Designing for Growth Field Book: A Step-by-Step Project Guide</i> (Columbia University Press, 2014)		
Reference Books			
1.	Jeanne Liedtka, Randy Salzman, and Daisy Azer, <i>Design Thinking for the Greater Good: Innovation in the Social Sector</i> (Columbia Business School Publishing, 2017)		
2.	Tom Kelly, <i>The Art of Innovation: Lessons in Creativity From IDEO, America's Leading Design Firm</i> (Profile Books, 2002)		
3.	Tim Brown, <i>Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation</i> (Harper Business, 2009)		
4.	Jeff Dyer, Hal Gregersen, Clayton Christensen, <i>The Innovator's DNA: Mastering the Five Skills of Disruptive Innovators</i> (Harvard Business Review Press, 2009)		
5.	Roger Martin, <i>The Design of Business: Why Design Thinking Is The Next Competitive Advantage</i> (Harvard Business Review Press, 2009)		
6.	Alexander Osterwalder and Yves Pigneur, <i>Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers</i> (John Wiley and Sons, 2010)		
7.	Nigel Cross, <i>Design Thinking: Understanding How Designers Think and Work</i> (Bloomsbury Academic, 2011)		
Weblinks: Other useful Design Thinking Frameworks and Methodologies			
1.	Human-Centered Design Toolkit (IDEO); https://www.ideo.com/post/design-kit		
2.	Design Thinking Boot Camp Bootleg (Stanford D-School); https://dschool.stanford.edu/resources/the-bootcamp-bootleg		
3.	Collective Action Toolkit (Frog Design); https://www.frogdesign.com/wpcontent/uploads/2016/03/CAT_2.0_English.pdf		
4.	Design Thinking for Educators (IDEO); https://designthinkingforeducators.com		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		No. 57	Date 05-12-2019



Course code	TYPOGRAPHY	L	T	P	J	C
BDE1021		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 01.00				
Course Objectives:						
<ul style="list-style-type: none"> Explain the History, Classification, Anatomy and Application of typefaces. State the Principles of Typographic Design (Expressive Typography. Compositions with type.) Demonstrate the importance of Information hierarchy using Grid Systems in Layouts. Describe characteristics of well-designed typographic applications in different mediums such as Books, Magazines, New media, Posters, Signage, Motion graphics, Online etc. Apply the learnt concepts of typographic design in multiple deliverables (print and online) 						
Expected Course Outcome:						
By the end of the semester students will be able to:						
<ul style="list-style-type: none"> Recognize and classify type based on form, usage and historical origin. Apply to create artefacts based on Typographic design principles in a series of design assignments Design and print a multi-page publication that incorporates the purposeful organization of type and image, using industry-standard desktop publishing software. 						
Module:1		6 hours				
Introduction to Evolution of Writing, Origin of Letterforms, Historic classification of Typefaces and evolution of styles						
Module:2		6 hours				
Anatomy, Structure and Terminology of Typefaces and their areas of Applications (Key terms pertaining to type design, Strokes and proportion)						
Module:3		3 hours				
Typographic Principles and Elements of Type design (Measuring type/ Type space/Leading/Kerning)						
Module:4		6 hours				
Introduction to Grid Systems in designing layouts for multiple products such as books, magazines, newspaper and website (Choosing the appropriate type based on need, Information hierarchy, Readability, Spacing, Justification)						
Module:5		9 hours				
Expressive typography/ meaningful type/ type and color						
Demonstrate ability to form and defend value judgments about graphic design and to communicate art ideas, and concepts.						
Typography in designing Brand identities and establish its brand value						



Module:6		9 hours
<p>Create and develop visual form in response to communication problems, including an understanding of principles of visual organization/ composition, information hierarchy, symbolic representation, typography, aesthetics, and the construction of meaningful messages.</p> <p>Introduction to publication design software</p> <p>Designing Expressive Typographic books for Children</p>		
Module:7		9 hours
<p>Describe and respond to the audiences and contexts, which communication solutions must address, including recognition of the physical, cognitive, cultural, and social human factors that shape typographic design decisions</p> <p>Typographic Poster design for Social issue/cause/concerns</p>		
Module:8	Contemporary issues:	12 hours
<p>Exploration of three dimensional features of letter forms and types in animation.</p> <p>Designing 3D artefacts using Indian Vernacular typefaces – Multilingual scripts</p>		
Total Lab hours:		60 hours
Text Book(s)		
1.	Thinking With Type by Ellen Lupton, Princeton Architectural Press; 2nd Revised edition edition (6 October 2010) ISBN-10: 1568989695 ISBN-13: 978-1568989693	
2.	Bringhurst, Robert, The Elements of Typographic Style (Second Edition), Publisher: Hartley & Marks Inc.,U.S.; 2nd edition edition (30 September 1996) ISBN-10: 0881791326 ISBN-13: 978-0881791327	
3.	Chapell Warren, The Short History of the Printed World, Publisher: Hartley and Marks Publishers; Revised, Updated, Subsequent edition (June 1, 2000) ISBN-10: 0881791547 ISBN-13: 978-0881791549	
4.	Grid Systems in Graphic Design: A Visual Communication Manual for Graphic Designers, Typographers and Three Dimensional Designers by Josef Müller-Brockmann (Author) Publisher: Antique Collectors Club; Bilingual edition (1999) ISBN-10: 9783721201451 ISBN-13: 978-3721201451	
5.	Muller –Brockman, Josef, History of Visual Communication, Publisher: Niggli Verlag (January 5, 1999), ISBN-10: 3721201884 ISBN-13: 978-3721201888	
6.	Rehe, Rolf - Typography: How to make it most legible	
7	Typographic Design: Form and Communication By Rob Carter, Ben Day, Philip B. Meggs Publisher: John Wiley & Sons; 5th Revised edition edition (2 December 2011) ISBN-10: 047064821X ISBN-13: 978-0470648216	
8.	Elam, Kimberly; Expressive Typography. The word as image, John Wiley & Sons Inc (1 December 1989).	
9.	Meggs' History of Graphic Design Hardcover – 20 May 2016 by Philip B. Meggs (Author), Alston W. Purvis (Author) Publisher: John Wiley & Sons; 6th edition (20 May 2016) ISBN-10: 1118772059 ISBN-13: 978-1118772058	
10	Typographic Layout and Composition Timothy Samara,	
11.	Design Elements : Understanding the Rules and Knowing When to Break Them - Updated and Expanded By (author) Timothy Samara Publication date 15 May 2014 Publisher Rockport Publishers Inc. ISBN10 1592539270 ISBN13 9781592539277	



12.	Making and Breaking the Grid: A Graphic Design Layout Workshop by <u>Timothy Samara</u> Published May 1st 2005 by Rockport Publishers (first published January 1st 2003) ISBN 1592531253 (ISBN13: 9781592531257)		
Reference Books			
1.	Ruder, Emil; Typography, a manual of Design, Verlag Niggli AG; 7th Revised edition (March 1, 2001)		
2.	Gerard Unger: While You're Reading, Mark Batty Publisher (January 2006) ISBN-13: 978- 0976224518		
3.	Graphic Design Manual : Principles and Practice By (author) <u>Armin Hofmann</u> Publication date 28 Mar 2019 Publisher <u>Niggli Verlag</u> , ISBN10 3721210069 ISBN13 9783721210064		
4.	John Kane, Fundamentals of Typography, A Type Primer, Publisher: Laurence King Publishing ISBN: 9781856696449, 9781856696449 Edition: 2011		
4.	Jost Hochuli: Detail In Typography, Hyphen; 1 edition (February 27, 2008) ISBN-13: 978- 0907259343		
5.	Kimberly Elam, Grid Systems: Publisher: Princeton Architectural Press (12 August 2004) ISBN-10: 1568984650 ISBN-13: 978-1568984650		
6.	<p>Rand, Paul A Designer's art: November 15, 2016, Publisher: Princeton Architectural Press (November 15, 2016) ISBN-10: 9781616894863 ISBN-13: 978-1616894863</p> <p>Design Form and Chaos December 5, 2017 Publisher: Yale University Press (December 5, 2017) ISBN-10: 0300230915 ISBN-13: 978- 0300230918</p> <p>From Lascaux to Brooklyn : December 5, 2017 Publisher: Yale University Press (December 5, 2017) ISBN-10: 8970591303 ISBN-13: 978-0300230925</p>		
7.	https://blog.prototypr.io/50-essential-books-every-graphic-designer-should-read-1c611f77aa5a		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		No. 57	Date 05-12-2019



Course code	PACKAGING DESIGN	L	T	P	J	C
BDE1022		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 01.00				
Course Objectives:						
<p>1. Seeing in 3D - Learn about foundation types of 3D packaging and important design principles for create effective packages, including product type, composition, visibility, consistency, shape, and audience.</p> <p>2. Mass vs. Prestige - Explore the design, budgetary, and production choices of designing for mass or prestige audiences. Case studies from beauty and cosmetics industry illustrate how packaging designs communicate value or value-for-money, and exclusivity or accessibility. Take a field trip to identify some mass and prestige packaging as well as study counter animation.</p> <p>3. Tangible Visual Marketing – Understand the role of target markets in creating packaging designs. Look at how demographics are collected and how to use and go beyond marketing data to target your package designs. Examples and case studies explore how very specific marketing briefs can translate into design choices.</p> <p>4. Playful Design - A whimsical, fun, or simply unexpected design can attract consumers to your product package and make a memorable statement. Learn how and when to infuse your package designs with playful, lively visuals. Case studies will open your eyes to some of the most fun packaging around.</p> <p>5. Branding Product Lines - Most products don't just stand alone. Typically, a package design is part of an entire product line which has an established brand and a visual style all of its own. Examine how product lines are branded, expanded, and kept consistent. You will study which components are variable so that each product in the line is unique. Project - Champagne carton</p> <p>6. Launching a New Product Design Apply strategies for making powerful presentations, and the revisions you can expect to make along the way to a packaging design project. In the final project, you will design, present, and "launch" a perfume box and bottle design.</p>						
Expected Course Outcome:						
By the end of the semester students will be able to: <ul style="list-style-type: none"> • Identify the key elements of a packaging composition including placement, product, and audience. • Identify the production, design, and budgetary differences between mass and prestige packaging designs. • Develop an understanding of the ways in which marketing research, target audiences, and user profiles affect the packaging design process. • Develop an understanding of how playful packaging design is created through typography, balance, color, and other attributes.. • Understand and discuss how a product line is developed, updated, and expanded. 						
Module:1		9 hours				



Seeing in 3D, Project – Indian Tiffin/Snacks Take away packages <i>OR</i> Fixing School Food: Promoting healthy alternatives among kids.		
Module:2		9 hours
Mass Vs Prestige, Project - Mass design (Gas stove) <i>OR</i> GIFT-BOX REUSE: Inventing secondary uses for packages.		
Module:3		9 hours
Tangible Visual Marketing , Project – Soft drinks & Beverages		
Module:4		9 hours
Playful Design ,Project - Toy packaging <i>OR</i> IN/VISIBLE MESSAGE: Designing a coffee cup sleeve with a secret message?		
Module:5		9 hours
Branding Product Lines, Project - Champagne carton <i>OR</i> Packaging Culture: Finding packaging solutions for a multi-cultural gift shop.		
Module:6		15 hours
Launching a New Product Design , Project - Cosmetic packaging		
	Total Lab hours:	60 hours
Text Book(s)		
1.	Packaging Design; Successful Product Branding from Concept to Shelf by Klimchuk & Krasovec (2012, Second Edition pub Wiley)	
2.	The Packaging Designers’ Book of Patterns by Lászlo Roth, Publisher: Wiley; 4 edition (19 November 2012) ASIN: B00AB1T7FC	
3.	For Sale: Over 200 Innovative Solutions in Packaging Design By John Foster, Publisher: HOW Books (October 6, 2008) ISBN-10: 1600610633 ISBN-13: 978-1600610639	
4.	Paper Folding Templates for Print Design: Formats, Techniques and Design Considerations for Innovative Paper Folding By Trish Witkowski, Publisher: HOW Books; Pap/Cdr edition (January 24, 2012) ISBN-10: 9781440314124 ISBN-13: 978-1440314124 ASIN: 1440314128	
5.	Best Practices for Graphic Designers: Packaging By Grip, Publisher: Rockport Publishers (December 15, 2013) ISBN-10: 1592538134 ISBN-13: 978-1592538133	
6.	Amazing Package Design By Editors of HOW Magazine (Digital Download)	
7.	Package Design Workbook: The Art and Science of Successful Packaging by <u>Steven DuPuis</u> (Author), <u>John Silva</u> (Author) Publisher: Rockport Publishers; Reissue edition (June 1, 2011) ISBN-10: 1592537081 ISBN-13: 978-1592537082	
8.	Packaging Essentials: 100 Design Principles for Creating Packages (Design Essentials) 1st Edition by <u>Candace Ellicott</u> (Author), <u>Sarah Roncarelli</u> (Author) Publisher: Rockport Publishers; 1 edition (June 1, 2010) ISBN-10: 1592536034 ISBN-13: 978-1592536030	
9.	The Package Design Book by <u>Pentawards</u> (Editor), <u>Julius Wiedemann</u> (Editor) Publisher: TASCHEN (November 25, 2017) ISBN-10: 3836555522 ISBN-13: 978-3836555524	
References		
	Blogs/Websites	
1.	Communication Arts _https://www.commart.com/	



2.	Print https://www.printmag.com/		
3.	How https://www.howdesignlive.com/		
4.	Graphis http://www.graphis.com/		
5.	Creative Quarterly https://www.cqjournal.com/		
6.	Eye http://www.eyemagazine.com/		
7.	Émigré https://www.emigre.com/Magazine		
8.	Wired https://www.wired.com/		
9.	thedieline.com		
10.	lovelypackage.com		
11.	packagingserved.com /		
12.	ernestpackaging.com/blog		
13.	cr8id.com		
14.	packagingdesignarchive.org		
15.	ambalaj.se bpando.com		
16.	underconsideration.com/brandnew/		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies	27-11-2019		
Approved by Academic Council	No. 57	Date	05-12-2019



Course code	Course title	L	T	P	J	C
BDE1023	PRODUCT SEMIOTICS	2	2	0	0	3
Pre-requisite		Syllabus version				
Nil		V. XX.XX				
Course Objectives						
1. To understand the science of signs associated with product design						
2. To be able to understand and apply the semantic, syntactic, and pragmatic aspects of design						
Course Outcome						
Students will have,						
1. Ability to understand the meaning of symbols, icons, and indexes						
2. Knowledge to analyze the semiotic analysis of products						
3. Ability to decipher and manipulate the meanings of product forms						
4. Ability to decipher and manipulate the syntactic aspects of product forms						
5. Ability to decipher and manipulate the pragmatic aspects of product forms						
Module:1	Introduction to Product Semiotics	2 hours				
Overview of the subject and its implications to product design						
Module:2	Signs	4 hours				
Science of signs; Symbols; Icons; Indexes						
Module:3	Semantic Aspects of Product Forms	4 hours				
Meanings of Form; Decoding and Encoding meanings in product design						
Module:4	Syntactic Aspects of Product Forms	4 hours				
Arrangement of visual, emotional, and intellectual elements in a product form						
Module:5	Pragmatic Aspects of Product Forms	4 hours				
Application of different signs on forms; Manipulation techniques of pragmatics						
Module:6	Semiotic Studies on Products	4 hours				
Studies on semantic, syntactic, and pragmatic aspects in product design						
Module:7	Role of Semiotics in Product Aesthetics	6 hours				
Framework of product aesthetics and the aspects of semiotics						
Module:8	Contemporary Studies	2 hours				
Contemporary studies on the Product Semiotics by practicing designers						
Total Lecture hours:		30 hours				



Text Book(s)		
1.	Burdek B.E. (2010). Objects: In between language and meaning. MEI (Mediation et Information). ISBN: 978-2-296-11707-5.	
Reference Books		
1.	Hekkert P and Schifferstein, (2008). Product Experience. Elsevier, UK and Netherlands.	
2.	Lidwell, Holden, Butler [Eds] (2013). Universal Principles of Design, Rockport Publishers, USA and Singapore.	
Mode of Evaluation: CAT / Written assignment / Quiz / FAT		
Recommended by Board of Studies	14-9-2020	
Approved by Academic Council	No. 59	Date 24-9-2020



Course code	ORIGAMI	L	T	P	J	C
BDE1024		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
1. To acquaint students with basics of origami. 2. Obtain a knowledge on various hand building techniques using paper. 3. Obtain a knowledge and ability to use the appropriate construction techniques to design using paper.						
Expected Course Outcome:						
1. To work with paper using various folding techniques. 2. Ability to make models keeping physical and geometric properties of paper and folding. 3. Create modular origami and building large scale structures 4. Ability to work with fractals and tessellations						
Module:1		6 hours				
History of origami						
Module:2		8 hours				
Physical and geometric properties of paper and folding						
Module:3		8 hours				
Basic Concepts like dividing the paper, Linear Divisions, Rotational Divisions Grid divisions						
Module:4		8 hours				
Symmetrical Repeats: Translation, Reflection, Rotation and Glide Reflection						
Module:5		6 hours				
Stretch and Skew, Polygons						
Module:6		10 hours				
Basic Pleats: Accordion Pleats, Knife Pleats, Box Pleats, Incremental Pleats, Spiral ,Gathered & twisted Pleats						
Module:7		10 hours				
V-Pleats, Spans & Parabolas, Boxes & Bowls and Crumpling techniques						
Module:8	Contemporary issues:	4 hours				
Contemporary discussion with the artists and designers.						



	Total Lab hours:		60 hours	
Text Book(s)				
1.	Paul Jackson; Folding Techniques for Designers from Sheet to Form, Laurence King Publishing,2011			
Reference Books				
1.	Robert J.Lang; Origami Design Secrets: Mathematical Methods for an Ancient Art, 2003			
Mode of Evaluation: Assignment / FAT / Project				
Recommended by Board of Studies		27-11-2019		
Approved by Academic Council		57	Date	05-12-2019



Course code	USER EXPERIENCE DESIGN	L	T	P	J	C
BDE1025		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
In this course, the students will learnt about:						
<p>1. What does UX mean?</p> <ul style="list-style-type: none"> • User Centred Design history – Evolution of Humans, fulfilling needs through ages by design • User Experience Design and User Interface Design: Definitions, Roles and Profiles. • User Centred Design as a process. • Product design its relevance of UX Design <p>2. Learn fundamentals of User Centred Design</p> <ul style="list-style-type: none"> • The working processes for building a satisfying user experience. • Focus on niches. • MVP (Minimum Viable Product). • Problem solving <p>3. Understanding Users and their contexts</p> <ul style="list-style-type: none"> • Understanding Users – Observations, Recordings, Interviews - Designing Questionnaires, Data Collection, • Storytelling techniques: storyboarding and product stories. • Usability – Principles and Guidelines <p>4. Analyze and Interpret User data</p> <ul style="list-style-type: none"> • Analyzing Data (Quantitative & Qualitative), • Get Insights & Draw Inferences, • Refine/Reframe problem statement <p>5. Design Prototypes</p> <ul style="list-style-type: none"> • Learn to use industry standard software tools to make interactive prototypes (Low-fidelity and High fidelity using any tool – <p>6. Conduct Usability Testing</p> <ul style="list-style-type: none"> • Testing is a core activity of the UX Designer to evaluate the effective of the designed solution. Introduction to few Usability Testing tools and techniques. <p>7. Select a great personality and find out about their contributions to the field of User Experience Design.</p>						
Expected Course Outcome:						
<ol style="list-style-type: none"> 1. Learn the of History of UCD with reference to human evolution. 2. Define User Centred Design Process, Frameworks and apply UCD in a given context. 3. State Usability Principles & Guidelines 4. Ability to conduct User study, Collect pertinent data, Analyze data, formulate insights and inferences into actionable points to design. 5. Acquire proficiency to use software tools for designing solutions and test its effectiveness 6. Possess understanding about various factors influencing ethical values in UCD. 7. Describe the important personalities in UCD and the impact/relevance of their contribution 						
Module:1	What does User Experience mean?	9 hours				



<p>Basic process of user centred design and its history of human evolution from Hunter-Gather, Agriculture – Settlers, tools design & development, Scripts & Writings, Social Systems Structures, Impact of Technology, Industrial Age, Modern Age (WW 1 & 2), Post Cold War, Information Age and Design Futures</p> <p>Collate any period of human evolution, aggregate content pertaining to the selected period to Design a timeline that period to be presented it as well designed “Information Graphic” chart</p>		
Module:2	Fundamentals of User Centred Design	6 hours
<p>Identify a design need/gap/problem/issue and apply UCD process with details of tasks and activities to be performed in each stage.</p>		
Module:3	Understanding Users and their contexts	9 hours
<p>Improve user experience in any existing mobile application by conducting evaluation using various methods and techniques. Identify areas to improve end user experience. Propose design enhancements for important tasks/activities as static screen designs.</p>		
Module:4	Analyze User data, Use Insights to Design Prototypes	18 hours
<p>Identify a social need/gap/opportunity for an digital application. Demonstrate creation of solution by following UCD process.</p> <p>The final deliverable is to design high fidelity clickable prototype for most critical task flow incorporating Icon, Navigation and Interaction Design elements based on user experience guidelines.</p>		
Module:5	Conduct Usability Testing	6 hours
<p>Test the effectiveness of the designed solutions using appropriate tools and techniques with the target audience.</p>		
Module:6	Eminent personalities and their contributions in the field of User Experience Design.	9 hours
<p>Select on eminent designer and conduct a research about his life, work and its relevance. The findings has to be presented as a concise and engaging well designed presentation in 15 slides</p>		
Module:7	Contemporary issues:	3 hours
<p>Expert lecture from Industry sharing insights, best practices and case studies</p>		
Total Lab hours:		60 hours
Text Book(s)		
1.	<p>Universal Principles of Design: 100 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach Through Design by William Lidwell, Jill Butler, Kritina Holden, ISBN: 1592535879, Publisher: Rockport Publishers; Second Edition, Revised and Updated edition (1 January 2010)</p>	
2.	<p>The Design of Everyday Things by Donald A. Norman, Publisher: Basic Books; 2 edition (5 November 2013) ISBN-10: 9780465050659 ISBN-13: 978-0465050659</p>	
3.	<p>Start with Why: How Great Leaders Inspire Everyone to Take Action by Simon Sinek, Publisher: Penguin UK; Latest Edition edition (6 October 2011) ISBN-10: 9780241958223 ISBN-13: 978-0241958223</p>	
4.	<p>Dont make me think by Steve Krug ZHU, Published by Machine Press (2014)</p>	



	ISBN 7111184823 (ISBN13: 9787111184829)		
5.	Hooked: How to Build Habit-Forming Products by Nir Eyal , Published 2014 by Portfolio ISBN 1591847788 (ISBN13: 9781591847786)		
6.	The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses by Eric Ries , Publisher: Currency; 1 edition (13 September 2011) ISBN-10: 9780307887894 ISBN-13: 978-0307887894		
7.	100 Things Every Designer Needs to Know about People by Susan M. Weinschenk , Publisher: New Riders; 1 edition (14 April 2011) ISBN-10: 0321767535 ISBN-13: 978-0321767530		
8.	Designing Visual Interfaces: Communication Oriented Techniques (Kevin Mullet) , Published December 5th 1994 by Prentice Hall ISBN 0133033899 (ISBN13: 9780133033892)		
9.	Sprint (Jake Knapp) Publisher: Simon & Schuster; 1 edition (March 8, 2016) ISBN-10: 150112174X ISBN-13: 978-1501121746		
10.	Rework (Jason Fried and David Heinemeier Hansson) , Publisher: Currency (9 March 2010) ISBN-10: 0307463745 ISBN-13: 978-0307463746		
11.	Creative Confidence (Tom Kelley and David Kelley) Publisher: Currency (15 October 2013) ISBN-10: 038534936X ISBN-13: 978-0385349369		
Reference Books			
1.	Garrett, J. J. (2010). <i>Elements of user experience, the: user-centered design for the web and beyond</i> . Pearson Education. Publisher: New Riders; 2 edition (16 December 2010) ISBN-10: 0321683684 ISBN-13: 978-0321683687		
2.	Guastello, S. J. (2013). <i>Human factors engineering and ergonomics: A systems approach</i> . Publisher: Routledge; 2 edition (December 21, 2013) ISBN-10: 1466560096 ISBN-13: 978-1466560093		
3.	Rubin, J., & Chisnell, D. (2008). <i>Handbook of usability testing: how to plan, design and conduct effective tests</i> . John Wiley & Sons. 2nd edition (9 May 2008) ISBN-10: 0470185481 ISBN-13: 978-0470185483		
4.	Albert, W., & Tullis, T. <i>Measuring the user experience: collecting, analyzing, and presenting usability metrics</i> . Publisher: Morgan Kaufmann; 2 edition (July 17, 2013) ISBN-10: 0124157815 ISBN-13: 978-0124157811		
5.	Nunes, I. (2012). <i>Ergonomics-A Systems Approach</i> . InTech. Published: April 25th 2012 DOI: 10.5772/2232 ISBN: 978-953-51-0601-2		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		No. 57	Date 05-12-2019



Course code	INDIAN SYMBOLOGY	L	T	P	J	C
BDE1026		2	2	0	0	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
1. Semantics & Communication Theory <ul style="list-style-type: none">• Introduction to visual perception and Gestalt laws of organization.• Introduction to information theory and their application to spatial and spatio-temporal message design.• Concept of attention in perception.• Relationship between message design and attention, supported by eye movement studies. Exploring relationships between the semantics and the structure messages.						
2. Semiotic basics <ul style="list-style-type: none">• Objects, definition, structure, semiosis• Signs and their forms Codes and contextual representation.• Sociology and human needs• Rituals religion and expression. Art and aesthetics as meaning of expression.• Meaning making, reproduction of image and technology, post modernism and popular culture.						
3. Indian Culture, art and aesthetics through history <ul style="list-style-type: none">• The oriental context emphasis on Indian cultural representations.• Graphic narratives-Oral Traditions from the ancient to the present.• Contextual narratives, words and image in storytelling (Gond, Warli, Kalighat Art)• Oral narrative to pictorial art (Murals and Architecture),• Form painting to storytelling through pictures(Patua art),• Narrative sequence, genre, audience, universe and techniques (Graphic novels, Cinema posters)						
4. Indian Visual Cultural Images & Symbols <ul style="list-style-type: none">• Images as Signs• Changing character of Media• Images and Technology• ‘Looking’ at the familiar with unfamiliar eyes• Communities and Culture Global/Local representation• Visual Displays• Symbolism in modern channels of communication						
5. Indian Symbolism – Thoughts, Traditions Practices and in Contemporary communications. <ul style="list-style-type: none">• Study on Indian Symbolism as thought and philosophy in the context Art, Music and Architecture.• Meaning of our festivals, mythology, the nature of religious ceremonies and other cultural diversities.• Study of various Indian visual symbols.• Study of Indian patterns and colors.• Discussion of Indian cultural identity and its modern symbolism interpretation used in						



contemporary communications.		
<ul style="list-style-type: none"> • Experiments with designs using both traditional and modern symbols to create a sense of “Indian Identity” a communication artefacts (Installation, Way finding system, Space Design) 		
Expected Course Outcome:		
5. Explore relationships between the semantics and the structure messages. 6. Develop knowledge on Art and aesthetics as meaning of expression 7. Understanding of Symbolism in modern channels of communication 4. Acquire Knowledge on various Indian visual symbols.		
Module:1	Semantics & Communication Theory	9 hours
<ul style="list-style-type: none"> • Make abstract photographic compositions as typographic elements using Gestalt principles in development of visual messages to design a calendar. 		
Module:2	Semiotic basics	6 hours
<ul style="list-style-type: none"> • Select mundane everyday object from Indian environment for its “symbolic” values in various context of use, such as representation, meanings, interpretation, belief, physical positioning/display. • Present the findings as an interesting poster (18”X24”) 		
Module:3	Indian Culture, art and aesthetics through history	12 hours
“Everything is recycled in India, even dreams.” — Shashi Tharoor <ul style="list-style-type: none"> • Design a graphic narrative as engaging story (4 A4 pages) incorporating re-symbols using traditional art form (resembles) synthesising with modern images. 		
Module:4	Indian Visual Cultural Images & Symbols	15 hours
<ul style="list-style-type: none"> • “India is the world’s largest democracy” • Make a compilation of all the political parties “symbols” and weave an interesting and compelling narrative as an multimedia statement which symbolises after 72 of Indian Independence 		
Module:5	Indian Symbolism – Thoughts, Traditions Practices and in Contemporary communications.	18 hours
<ul style="list-style-type: none"> • Select any Indian religious ceremony, festival or large celebration. Get to understand the setting, what objects sygnifies, sequence of acts and rituals performed specifying the role of participant and performer. • Find out the “symbolic” connotation for activities performed based on faith/belief and its relevance/significance to the participants (both from individual perspective and as society) • Design an 3D installations which symbolically represents the subject. 		
Total Lab hours:		60 hours
Text Book(s)		
1.	Moving Focus: Essays on Indian Art, by K. G Subramanyan. Publisher: Seagull Books; Edition edition (2006) ISBN-10: 8187507144 ISBN-13: 978-8170463085	
2.	Indian Art/Bharatiya Kala by Agrawal, V.S. ISBN-10: 9351460010 ISBN-13: 978-9351460015	
3.	Hindu View of Art by Ananad, Mulkraj, Publisher – Allen & Unwin, 1933	



	Indian Sculpture: Circa 500 B.C.-A.D. 700 Authors Los Angeles County Museum of Art , Pratapaditya Pal Publisher University of California Press, 1986 ISBN 0520059913, 9780520059917
4.	Early Indian Sculpture, 2 vols by Bachoffer, L. Publisher: Hacker Art Books; Facsimile edition edition (1 March 1975) ISBN-10: 0878170588 ISBN-13: 978-0878170586
5.	Development of Hindu Iconography by Banerjee, J.N. Publisher: Munshiram Manoharlal Publishers; 3rd Rev edition (30 November 1956) ISBN-10: 8121500699 ISBN-13: 978-8121500692
6.	History of Indian and Indonesian Art by Coomarswamy, A.K, Publisher Dover Publications, 1985, ISBN 0486250059, 9780486250052
7.	Indian Sculpture by Kramrisch, Stella, Publisher: Motilal Banarsidass,; Second Reprint edition (1 March 2013) ISBN-10: 8120836146 ISBN-13: 978-8120836143
8.	Indian Art by Mitter, Partha, Published July 19th 2001 by Oxford University Press, USA ISBN0192842218 (ISBN13: 9780192842213)
9.	Comparative Aesthetics Vol. 1: Indian Aesthetics Vol. 2: Western Aesthetics by Pandey, K.C. Publisher: CHOWKHAMBA SANSKRIT SERIES OFFICE VARANASI; FORTH & THIRD edition (2015) ISBN-10: 8170804450 ISBN-13: 978-8170804451
10.	South Indian Bronzes by Shivramamurti, C. Publisher: Lalit Kala Akademi (1981) ASIN: B0042LU0KI
11.	Natya Sastra by Vatsyayan , K. Publisher: Sahitya Akademi (31 December 2007) ASIN: B004AQ9QXM
12.	The Living Tradition, by K. G Subramanyan. Seagull Books Pvt.Ltd, (1 April 1987) ISBN-10: 8170460220 ISBN-13: 978-8170460220
13.	Iyer Bharatha K; Indian art-A short introduction, Publisher Taraporwala, Mumbai, 1982
14.	Boner, Sharma Baumer; Vastusutra Upanishad, Motilal Banarasides, Delhi, 1982
15.	Speaking with pictures: folk art and the narrative Tradition in India by Roma Chatterjee . , Publisher: Routledge India; 1 edition (12 June 2012) ISBN-10: 041552301X ISBN-13: 978-0415523011
16.	Smith, Marquard, 'Visual Culture Studies: Questions of History, Theory, and Practice' in Jones, Amelia (ed.) A Companion to Contemporary Art Since 1945, Oxford: Blackwell, 2006. ISBN 9781405135429
17.	Sturken, Marita; Lisa Cartwright (2007). Practices of Looking: An Introduction to Visual Culture, 2nd ed., Oxford: Oxford University Press. ISBN 0-19-531440-9.
18.	Lal, Vinay & Nandy, Ashis (Eds.), Fingerprinting Popular Culture : The Mythic and the Iconic in Indian Cinema, 2006 ISBN : 0195679180
19.	Richards, Asha; Pop Culture India!: Media, Arts, and Lifestyle (Popular Culture in the Contemporary World): ABC-CLIO, 2006 I SBN-10: 1851096361 I SBN-13: 978-1851096367
20.	Dikovitskaya, Margaret; Visual Culture: The Study of the Visual after the Cultural Turn, 1st Ed., Cambridge, Ma: The MIT Press, (2005 (cloth), 2006 (paperback)), ISBN 0-262-04224-X.
Reference Books	
1.	Crary, Jonathan; Techniques of the Observer: On Vision and Modernity in the 19th Century, Publisher: The MIT Press; Reprint edition, 1992
2.	Fuery, Kelli & Patrick Fuery (2003). Visual Culture and Critical Theory, 1st ed., London: Arnold Publisher. ISBN 0340807482.
3.	Jay, Martin (ed.), 'The State of Visual Culture Studies', themed issue of Journal of Visual Culture, vol.4, no.2, August 2005, London: Sage. ISSN 14704129. eISSN 17412994
4.	Sign an introduction to Semiotics bt Thomas A Sebeok. University of Toronto press
5.	The Basic Semiotics by Daniel Chandler. Publisher: Routledge; 2 edition (9 January 2007)



	ISBN-10: 0415363756 ISBN-13: 978-0415363754		
6.	Analysing Discourse: Textual Analysis for Social Research, by Norm, Publisher: Routledge (July 18, 2003) ISBN-10: 0415258936 ISBN-13: 978-0415258937		
7.	Mirzoeff, Nicholas (ed.) (2002). The Visual Culture Reader, 2nd ed., London: Routledge. ISBN 0-415-25222-9.		
8.	Morra, Joanne & Smith, Marquard (eds.) (2006). Visual Culture: Critical Concepts in Media and Cultural Studies, 4 vols. London: Routledge. ISBN 0-41-532641-9.		
9.	Visual Communication: more than meets the eye by Harry Jamieson. Intellect Books UK		
10.	Plate, S. Brent, Religion, Art, and Visual Culture. (New York: Palgrave Macmillan, 2002) ISBN 0-312-24029-5		
11.	Practices of Looking: an introduction to visual culture by Marita Sturken & Lisa Cartwright. Publisher: Oxford University Press; 2 edition (January 2, 2009) ISBN-10: 0195314409 ISBN-13: 978-0195314403		
12.	Colour and meaning: art, science and Symbolism, by John Gage. Publisher University of California Press, 1999 ISBN 0520226119, 9780520226111		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies	27-11-2019		
Approved by Academic Council	No. 57	Date	05-12-2019



Course code	INTERACTION DESIGN	L	T	P	J	C
BDE1027		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
In this course, the students will learn about:						
<ol style="list-style-type: none"> 1. Learn essentials of interaction design 2. Understand principles of interactive system design 3. Explain importance of goal directed interaction design 4. Describe different interface design guidelines and their application for creating interactions 						
Expected Course Outcome:						
At the end of this course students will be able to,						
<ol style="list-style-type: none"> 1. Explain the fundamentals of Interaction Design (ID): Definition of ID; Types of Interactions; Goal-Directed Design Principles 2. Explain the Principles of Interface Design, Navigation design and Interaction design. 3. Ability to apply design process of Human-Centred Interactive systems 4. Possess knowledge of PACT: A framework for designing interactive systems and demonstrate its application as case study 5. State Experience design guidelines 6. Proficient in use of software tools to Create, Build and Test the designed prototypes to check its effectiveness. 						
Module:1	Essentials of interaction design	9 hours				
Select a suitable a product (Tangible /Digital Product) to explain the application of Principles and Types of Interactions incorporated. Analyse and Present findings/observations with recommendations to improve end user experience..						
Module:2	Understand principles of interactive system design	9 hours				
Identify one Indian Government website/portal and check effectiveness by conducting a Usability Evaluation of Interaction Design Principles (Visibility, Feedback, Constraint, Mapping Consistency, and Affordance). Propose interaction design enhancements as interactive screens for tasks/functions.						
Module:3	Explain importance of goal directed interaction design	9 hours				
Improve user experience in any of mobile application by redesigning the micro-interactions						
Module:4	Describe interface design guidelines and their application	9 hours				
Application of PACT framework on a selected topic as a case study						



Module:5	Design an digital application	24 hours
Identify a need/gap for a digital application for a social need and design high fidelity prototype for most critical task flow incorporating Icon, Navigation and Interaction Design elements based on user experience guidelines.		
	Total Lab hours:	60 hours
Text Book(s)		
1.	Mobile Interaction Design by Matt Jones and Gary Marsden, Publisher: Wiley; 1 edition (February 3, 2006) ISBN-13: 978-0470090893 ISBN-10: 0470090898	
2.	Preece, Rogers and Sharp, Interaction Design: Beyond Human–Computer Interaction, John Wiley and Sons, Delhi, 2003.	
3.	Shneiderman, Designing the User Interface: Strategies for Effective Human-Computer Interaction, (3rd Ed.), Addison Wesley, 2000.	
4.	Andrew Sears, Julie A. Jacko The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, New York: John Wiley & Sons, 2002.	
5.	Cooper, A., Reimann, R., Cronin, D., & Noessel, C. (2014). <i>About face: the essentials of interaction design</i> . John Wiley & Sons.	
6.	Benyon, D., Turner, P., & Turner, S. (2005). <i>Designing interactive systems: People, activities, contexts, technologies</i> . Pearson Education.	
Reference Books		
1.	Benyon, D. (2010). Designing interactive systems: a comprehensive guide to HCI and interaction design . Pearson Education.	
2.	Albert, W., & Tullis, T. (2013). Measuring the user experience: collecting, analyzing, and presenting usability metrics. Newnes.	
3.	Don Norman 1988 The design of everyday things Publisher: Basic Books; Revised edition (November 5, 2013) ISBN-10: 9780465050659 ISBN-13: 978-0465050659	
4.	Designing for Interaction – Dan Safer, New Riders; 2 edition (25 September 2009) (ISBN 0321643399)	
5.	About Face 3: The Essentials of Interaction Design, Alan Cooper, Robert Reimann, David Cronin, Publisher: John Wiley & Sons; 4th edition (19 September 2014) ISBN-10: 1118766571 ISBN-13: 978-1118766576	
Reference Websites		
1.	uie.com: http://www.uie.com/articles/subtle_interaction_design/	
2.	askTog.com: http://www.asktog.com/basics/firstPrinciples.html	
3.	UXMatters: http://www.uxmatters.com/mt/archives/2008/10/selling-ux.php	
4.	Google: http://www.google.com/corporate/tenthings.html	
5.	The Standish Group: http://www.standishgroup.com/sample_research/index.php	
6.	Forrester: http://www.forrester.com/ER/Research/Report/Summary/0,1338,8734,FF.html	
7.	Usability: http://www.useit.com	
Mode of Evaluation: Assignment / FAT / Project		
Recommended by Board of Studies	27-11-2019	
Approved by Academic Council	No. 57	Date 05-12-2019



Course code	SERVICE DESIGN	L	T	P	J	C
BDE1028		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
In this course, the students will learn about:						
<ol style="list-style-type: none"> 1. Understand the concept of Services in a networked society – Evolution & Present day context 2. Examine the essentials of Service Design, “Design is Invisible” 3. Learn about Service Design and Operation Lifecycle 4. Know the relevant design method for developing services 5. Understand the design process - Overview of the Double Diamond process 6. Demonstrate understanding of Tools and Methods for Service Design: <ul style="list-style-type: none"> • Discover - User Journey Mapping, User Diaries, Service Safari, User Shadowing, • Define – User Personas, Ideating and articulating a Design Brief • Develop – Service Blue printing, Experience prototyping, Business Model canvas • Deliver - Scenarios 						
Expected Learning Outcomes:						
<ol style="list-style-type: none"> 1. Explain the concept of Services in a networked society – Evolution & Present day context 2. State the fundamentals of Service Design, 3. Describe various aspects of Service Design and its Operation Lifecycle 4. Explain the need for a design method for developing services 5. Build a Service Design intervention using double diamond process 6. Demonstrate understanding of Tools and Methods for Service Design 7. Present a detailed Service Design proposal using all the learnt knowledge 						
Module:1		9 hours				
Understand the concept of Services in a networked society – Evolution & Present day context						
Module:2		6 hours				
Examine the essentials of Service Design, “Design is Invisible”						
Module:3		12 hours				
Learn about Service Design and Operation Lifecycle						
Module:4		3 hours				
Know the relevant design method for developing services						
Module:5		5 hours				
Understand the design process - Overview of the double diamond phases						
Module:6		25 hours				
Demonstrate understanding of Tools and Methods for Service Design						



		Total Lab hours:	60 hours
Text Book(s)			
1.	Norman, D. 2011. Living with Complexity. Cambridge, MA: The MIT Press.		
2.	This is Service Design Thinking. Published in 2010 by BIS Publishers ISBN 978-90-6369-256-8		
3.	Design methods for developing services – an introduction to service design and a selection of service design tools, Publisher Routledge, 2016 ISBN 1317181743, 9781317181743		
4.	Service Design Tools. 2010. Retrieved June 1, 2010: servicedesigntools.org		
5.	Nielsen, J. 2005. Heuristic evaluation. Retrieved June 10, 2011 from: www.useit.com/papers/heuristic/		
6.	Glushko, R. 2010. Seven Contexts for Service System Design. (ischool.berkeley.edu/glushko)		
7.	Ricketts, J. 2008. Reaching the Goal: How Managers Improve a Service Business Using Goldratt’s Theory of Constraints. Upper Saddle River, NJ: IBM Press/Pearson PLC.		
Reference Books			
1.	Moritz, S. 2005. Service design – Practical access to an evolving world. Köln International School of Design (KISD), Köln, Germany.		
2.	Bruce, M., Bessant, J. Design in business: Strategic innovation through design. Design Council, UK. (2002)		
3.	Experience Design Board: A tool for visualizing and designing experience-centric service delivery processes – Chiehyeon Lim, Kwang-Jae Kim , https://doi.org/10.1016/j.jretconser.2018.07.021		
4.	Ferrario, R. and N. Guardino. 2008. Towards an Ontological Foundation for Services Science. Proceedings of the Future Internet Symposium, Vienna Austria, 28-30 September 2008.		
5.	Verganti, R. 2009, Design Driven Innovation, Harvard Business Press, Boston		
6.	Handy, C. 1995, The Gods of Management: The Changing Work of Organisations, Random House, London		
7.	Zeithaml, V. A., Parasuraman, A., Berry, L. L. Delivering Service Quality: Balancing Customer Perceptions and Expectations. The Free Press, 1990		
8.	Edman, K. W. (2009, November) Exploring overlaps and differences in service-dominant logic and design thinking. Paper presented at the 1st Nordic Conference on Service Design and Service Innovation, Oslo, Norway.		
Other References			
1.	Australian Government 2012, Australia in the Asian Century, Australian Government, http://asiancentury.dpmc.gov.au/white-paper		
2.	Service Design Network. 2010. Retrieved June 1, 2010: www.service-designnetwork.org/frontpage-com 4		
3.	Shostack, L. “Designing Services That Deliver,” Harvard Business Review, January-February, 133-9. (1984)		
4.	Service Design Network. Service design network manifesto. Unpublished. (2005).		
5.	Patricio, L, Fisk, R. P., & Cunha, J. F. (2008). Designing multi-interface service experiences: The service experience blueprint. Journal of Service Research, 10(4), 318-334.		
6.	Pinhanez, C. (2009). Services as customer-intensive systems. Design Issues, 25(2), 3-13.		
7.	Sangiorgi, D., & Clark, B. (2004, July 28). Towards a participatory design approach to service design. Paper presented at the 8th Biennial Participatory Design Conference, Toronto, Canada.		



Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies	27-11-2019		
Approved by Academic Council	No. 57	Date	05-12-2019



Course code	GAME DESIGN	L	T	P	J	C
BDE 1029		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
<ol style="list-style-type: none"> 1. To Identify the fundamental concepts and key issues of the Game development discipline. 2. To gain knowledge to create game for various platforms. 3. To Articulate a clear and comprehensive game structure which is verified during game development. 						
Expected Course Outcome:						
At the end of course, students should be able to,						
<ul style="list-style-type: none"> • Differentiate the tools and techniques involved in creating 2D & 3D games. • Identify and apply suitable methods to create games for various platforms. • Design and conduct experiments to address problems germane to the discipline. • Ability to understand current and future trends in gaming industry. • Integrate 2D & 3D assets in to Game Engines to publish Games. 						
Module:1		6 hours				
Game Design – an introduction (Game Theory, Detailed Design Docs, Storytelling, Visual Storytelling, Critical Game Analysis) . Various Genres of Games						
Module:2		8 hours				
Board games, Various platforms in games and their differences						
Module:3		8 hours				
Game Art and a comparison with Art asset creation for animation						
Module:4		8 hours				
Game Art production techniques and technologies involved for game development (a study on various game engines)						
Module:5		6 hours				
A detailed look at a 3D game engine						
Module:6		10 hours				
Game Design Documents and Technical Design Document . Level , Sound, UI Design						
Module:7		10 hours				
Production pipelines in game production . The gaming industry, Producing and Distribution . Making a playable level.						
Module:8	Contemporary issues:	4 hours				



Contemporary discussion with the artists and designers.			
		Total Lab hours:	60 hours
Text Book(s)			
1.	T Leo Hartas and Dave Morris, The Graphic Art of Computer Games, WatsonTGuptill, 2003		
2.	Chris Crawford, Game Design, New Riders, 2003		
3.	Katie Salen and Eric Zimmerman, Rules of Play: Game Design Fundamentals, The MIT Press, 2003		
4.	Josh Jenisch, The Art of the Video Game by, Quirk Books, 2008		
Reference Books			
1.	Jeannie Novak and Travis Castillo, Game Development Essentials: Game Level Design, Delmar Cengage Learning, 2008		
2.	Flint Dille and John Zuur Platten, The Ultimate Guide to Video Game Writing and Design, Lone Eagle, 2008		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		57	Date 05-12-2019



Course code	SYSTEMS DESIGN	L	T	P	J	C
BDE1030		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				

Course Objectives:

In this course, the students will learn about:

1. What is and why use a Systems Approach to Systems Design
 - Emergence – desirable and undesirable
 - Systems Thinking
 - Purpose and Context
 - System Boundary
 - Subsystems and super-systems
 - Events, patterns and behaviour
2. Relate Systems Thinking in systems design
3. Demonstrate designing in levels and the V diagram Generic system design process
4. Explain a Systems Approach to Determining Requirements
5. How to perform Gathering Requirements
 - Process for gathering requirements
 - Requirements Elicitation Plan
 - Stakeholder Analysis using the Stakeholder Map
 - Eliciting and Capturing Requirements
 - Affinity Diagrams
 - Use Cases
 - Tree Diagram
6. Analysing Requirements
 - Understanding Requirements
 - Holistic Requirements Model
 - Process for Analysing Requirements
 - Tools for Analysing Requirements
 - Need Means Analysis
 - Viewpoint Analysis
 - Functional Modelling
7. Show a Systems Approach to Systems Design
 - Technology and Architecture considerations
8. Build System Architecture
 - Principles of System Architecting
 - Logical System Architecting
 - N2 Analysis
 - Interface considerations
9. Generating technological solutions
 - Function Means Analysis
 - Down-selection
10. Systems Concept evaluation and selection
 - Decision Matrix
 - Pugh Matrix



Expected Learning Outcomes:

At the end of this course the students participants will:

- Have an understanding the principles of systems thinking and how it applies to the creation of a new system through the appropriate blend of people, process and tools
- Understand the critical role of requirements in engineering
- Identify system stakeholders and gather their requirements
- Analyse stakeholder requirements and translate these into specific, precise and measurable technical system requirements
- Generate and down-select alternative system design concepts and architectures.
- Consider the impact on future business of adopting a systems approach to systems design.

Module:1		3 hours
What is and why use a Systems Approach to Systems Design		
Module:2		3 hours
Relate Systems Thinking in systems design		
Module:3		3 hours
Demonstrate designing in levels and the V diagram Generic system design process		
Module:4		3 hours
Explain a Systems Approach to Determining Requirements		
Module:5		6 hours
How to perform Gathering Requirements		
Module:6		9 hours
Analysing Requirements		
Module:7		3 hours
Show a Systems Approach to Systems Design		
Module:8		9 hours
Build System Architecture		
Module:9		9 hours
Generating technological solutions		
Module:10		12 hours
Systems Concept evaluation and selection		
Total Lab hours:		60 hours
Text Book(s)		



1.	Armson, R. (2011). Growing wings on the way: Systems thinking for messy situations. Axminster, UK: Triarchy Press.
2.	Brown, T. Change by Design. Harper Business, New York, USA. Publisher: HarperBusiness (September 29, 2009) ISBN-10: 9780061766084 ISBN-13: 978-0061766084
3.	Checkland, P. (1981), Systems Thinking, Systems Practice. John Wiley & Sons, West Sussex, England, UK. Checkland, P. and Scholes, J. (1999), Soft Systems Methodology in Action. John Wiley & Sons, West Sussex, England, UK.
4.	Davidz, H., Nightingale, D., and Rhodes, D, (2005), "Enablers and Barriers to Systems Thinking Development: Results of a Qualitative and Quantitative Study," 3rd Conference on Systems Engineering Research, Hoboken, NJ, USA.
5.	Jones, J. C. (1970). Design methods: Seeds of human futures. London: Wiley-Interscience. ISBN-10: 0471447900 ISBN-13: 978-0471447900
6.	Patel, S. and Mehta, K. (2016), "Systems, Design, and Entrepreneurial Thinking: Comparative Frameworks." Systemic Practice and Action Research.
7.	Midgley, G. (Ed.). (2003). Systems thinking, Volumes 1-4. London: Sage ISBN-10: 0761949593 ISBN-13: 978-0761949596
8.	Sevaldson, B. (2011). GIGA-Mapping: Visualisation for complexity and systems thinking in design. Nordes, (4).Retrieved January 15, 2014, from http://ocs.sfu.ca/nordes/index.php/nordes/2011/paper/view/409/256 .
9.	Sanders, E. B.-N.,E. Brandt and T. Binder (2010). A Framework for Organizing the Tools and Techniques of Participatory Design. In: Proceedings of the 11th Biennial Participatory Design Conference, p.195-198. sydney, Australia: ACM
10.	Jordan, P.W., Designing Pleasurable Products; An Introduction to the New Human Factors, Publisher: Routledge; 1 edition (August 24, 2002) ISBN-10: 0415298873
Reference Books	
1.	K. T. Ulrich and Steven D. Eppinger, Product Design and Development (New York: McGraw-Hill, 2000).
	Kelley, T., & Littman, J. (2008). The ten faces of innovation: IDEO's strategies for beating the devil's advocate & driving creativity throughout your organization. London: Profile.
2.	Brooks, F.P., The Design of Design, Turing Award Lecture, http://terra.cs.nps.navy.mil/DistanceEducation/online.signature.org/2001/SpecialSessions/2000TuringLectureDesignOfDesign/session.html , 2000
3.	Simonsen, J. & Robertson, T. (2012).Routledge International Handbook of Participatory Design. London: Taylor & Francis.
4.	Greene, M.T. and Papalambros, P.Y. (2016). "A Cognitive Framework for Engineering Systems Thinking." Conference on Systems Engineering Research (CSER), March 22-24, 2016, Huntsville, AL, USA
5.	McGowan, AM, Bakula, C., and Castner, R. (2017), "Lessons Learned from Applying Design Thinking in a NASA Rapid Design Study in Aeronautics." Proceedings of AIAA SciTech 2017, Grapevine, FL, Jan 9-13.
6.	Ulrich, W. (1983). Critical heuristics of social planning: A new approach to practical philosophy. Bern: P. Haupt.
7.	Plattner, H., Meinel, C., and Leifer, L. (2011), Design Thinking: Understand, Improve, Apply. Springer, Verlag Berlin Heidelberg.
8.	Plattner, H., Meinel, C., and Leifer, L. (2014), Design Thinking Research: Building Innovation Ecosystems. Springer Switzerland.
9.	von Bertalanffy, L. (1956). General System Theory. General Systems, 1, 1–10.
10.	VanPatter, G. K., & Pastor, E. (2013). Innovation methods mapping. New York: Humantific



for OPEN Innovation Consortium.			
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies	27-11-2019		
Approved by Academic Council	No. 57	Date	05-12-2019



Course code	EXHIBITION DESIGN	L	T	P	J	C
BDE1031		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
<p>In this course, the students will learn about:</p> <ol style="list-style-type: none"> 1. Examine the role that exhibition design plays in communicating knowledge through history 2. Approaches to Exhibit Design (Subject Matter, Aesthetic, and Hedonistic i.e. engaged in the pursuit of pleasure; sensually self-indulgent.) 3. Exploration of display methods within the language of exhibits by Developing an exhibition storyline 4. Learn about various elements of process like space, function, materials, detailing and execution. 5. Explore various structural systems, forms and material possibilities in Exhibition design. 6. Perform Design ideation – Exhibition planning, Display, Visual Design, Interactions and installation for a variety of purposes. 						
Expected Course Outcome:						
<p>At the end of this course students will be able to:</p> <ol style="list-style-type: none"> 1. Analyze information from a wide range of sources to develop a detailed exhibition proposal for an identified audience / public venue. 2. Apply information on the audience(s) for a proposed public exhibition venue to develop an exhibition proposal. 3. Planning the layout and design of an exhibition 4. Report the key narratives / atmosphere / mood of an exhibition proposal to an identified audience. 5. Synthesize information from a wide range of sources to identify key artefacts and information, and to develop a series of key story lines / narratives for an exhibition proposal. 6. Evaluate ways in which exhibition practice can be more sustainable and apply those principles to an exhibition proposal. 						
Module:1		3 hours				
Introduction: Elements of an Exhibition						
Module:2		3 hours				
History of exhibition display						
Module:3		3 hours				
Anatomy of Exhibition						
Module:4		3 hours				
Designing exhibition: Basic approaches						
Module:5		3 hours				



Lighting, environmental control and security			
Module:6		3 hours	
Crating, mounting and installation			
Module:7		6 hours	
Exhibition Design interpretation and case studies			
Module:8		15 hours	
Visit a museum or an exhibition and analyze its existing design by proposing a enhanced alternative			
Module:9		21 hours	
Design an complete exhibition from identifying and selecting a topic, creating its design brief, construct its theme and presentation, make a model/mock up for presentation with photographs/videos			
		Total Lab hours: 60 hours	
Text Book(s)			
1.	Exhibition design / Philip Hughes. London: Laurence King, 2010.		
2.	Creating exhibitions : collaboration in the planning, development, and design of innovative experiences / Polly McKenna-Cress, Janet A. Kamien.Hoboken, New Jersey : Wiley, [2013]		
	Wayshowing: a guide to environmental signage; principles & practices / Per Mollerup. Baden: Lars Müller, 2005.		
3.	Light and Emotions: Exploring Lighting Cultures / Conversations with Lighting Designers / edited by Vincent Laganier & Jasmine van der Pol Published by Birkhauser, GmbH, Basel, 2011		
4.	<u>Made to Stick</u> by <u>Dan and Chip Heath</u> . Publisher: Random House; 1st edition (January 2, 2007) ISBN-10: 1400064287		
5.	Exhibition Design by David Dernie Publisher: W. W. Norton & Company (September 17, 2006) ISBN-10: 0393732118 ISBN-13: 978-0393732115		
6.	Exhibitions: Concept, Planning and Design by Tom Klobe Publisher: American Alliance Of Museums (April 20, 2012) ISBN-10: 193325369X ISBN-13: 978-1933253695		
7.	Exhibition Design: An Introduction Philip Hughes Publisher: Laurence King Publishing; 2 edition (September 8, 2015) ISBN-10: 1780676069 ISBN-13: 978-178067606		
8.	Brian O'Doherty, Inside the White Cube: The Ideology of the Gallery Space Publisher: University of California Press; Expanded edition (January 14, 2000) ISBN-10: 0520220404 ISBN-13: 978-0520220409		
9.	Leonard Koren, Arranging Things: A Rhetoric of Object Placement (Stone Bridge Press:Berkeley) 2003 ISBN-10: 1880656825 ISBN-13: 978-1880656822		
10.	Hodgetts + Fung: Scenarios and Spaces, "Experience and Scenario," (Rizzoli) 1997 ISBN 0847818136		
11.	Material World 2: Innovative Materials for Architecture and Design (Birkhäuser: Basel, Boston, Berlin) 2 Publisher: Birkhauser; 1 edition (January 3, 2007) ISBN-10: 3764372796		
Reference Books			



1.	The power of display : a history of exhibition installations at the Museum of Modern Art / Mary Anne Staniszewski. Cambridge, Mass. : MIT Press, c1998. ISBN-10: 0262194023		
2.	What makes a great exhibition? / Paula Marincola, editor. Philadelphia, PA : Philadelphia Exhibitions Initiative, Philadelphia Center for Arts and Heritage ; Chicago, IL : Distributed for Reaktion Books in the USA and Canada by the University of Chicago Press, c2006.		
3.	The manual of museum exhibitions / edited by Barry Lord and Gail Dexter Lord. Walnut Creek, CA : AltaMira Press, c2002.		
4.	Museums in motion: an introduction to the history and functions of museums / Edward P. Alexander and Mary Alexander. Lanham: AltaMira Press, c2008.		
5.	New media in the white cube and beyond: curatorial models for digital art / edited by Christiane Paul. Berkeley: University of California Press, c2008.		
6.	Herzog & de Meuron: natural history / edited by Philip Ursprung. Montréal: Canadian Centre for Architecture; [Baden, Switzerland] : Lars Müller, 2002, c2005.		
7.	Art and artifact: the museum as medium / James Putnam. New York, N.Y. : Thames & Hudson, c2001.		
Mode of Evaluation: CAT / Assignment / FAT / Project			
Recommended by Board of Studies	27-11-2019		
Approved by Academic Council	No. 57	Date	05-12-2019



Course code	APPLIED ERGONOMICS	L	T	P	J	C
BDE2004		2	0	2	0	3
Pre-requisite		Syllabus version				
BDE1004	Fundamentals of Ergonomics	v.2.0				
Course Objectives:						
<p>The students will be able to,</p> <ol style="list-style-type: none"> 1. Implement ergonomic principles to optimize human well-being and overall performance. 2. Analyse and implement solutions to a human factor problem. 3. Understand the impact of human factors in workplace design-environment and Productivity. 						
Expected Course Outcome:						
<p>The students will have,</p> <ol style="list-style-type: none"> 1. Ability to consider human factors and limitations in designing consumer/industrial products, workplaces and work environment. 2. Understanding the concepts of applied anthropometry, workplace design and the ergonomics aspects in various environmental conditions. 3. Ability to apply human factors in various environments and considering human factors in human errors & accidents. 4. Ability to perform ergonomic analysis in virtual environment. 5. Understanding the ergonomic principles in digital interfaces. 						
Module:1		2 hours				
Human centric Design of service/system. Selection of action in single/ multi task performance. Motor control of action – co-ordination of action, sequencing and timing of action- Reaction time.						
Module:2		4 hours				
Anthropometry for Product and Workspace Design. Decision making models, decision support and problem solving. Mental workload and situation awareness.						
Module:3		4 hours				
Factors in Organisational design and management – situation awareness. Affective engineering and design with respect to Workplace Design. Role of Illumination, Noise, Vibration, and Motion.						
Module:4		6 hours				
Management low back disorder in Workplace -MSD. Warning and Hazards communications. Use of personal protective equipment in workplace. Human error and reliability analysis						
Module:5		4 hours				
Digital Human simulation in Design and virtual environment. Accident and Incident investigation. Cost Benefit Analysis in Human-system Investments. Methods for evaluations outcomes.						
Module:6		4 hours				
Visual Displays – Information visualization. Human factors in Online communications and social						



computing. Usability testing – UX and UI perspectives. Website design and evaluation. Human Factors in ambience intelligence environments. Interactivity – Evolution and emerging tools.			
Module:7 Applications of Human factors and Ergonomics 4 hours			
Design for people with functional limitations, Aged and Children. Design for All: Computer assisted design of user interface. HFE in Manufacturing, Healthcare, Transport, Automation Design, and Aviation.			
Module:8 Contemporary issues: 2 hours			
Contemporary discussion with the artists and designers.			
Total Lab hours:			30 hours
List of Experiments (Indicative)			
<ol style="list-style-type: none"> 1. Ergonomic analysis of Manual Material Handling equipment. 2. Workspace design and seating, arrangement of components within a physical space. 3. Design of repetitive task, design of manual handling task. 4. Ergonomic analysis of Controls and data entry devices. 5. Illumination, climate, noise, motion, sound, vibration. 6. Human error, accidents, human factors and the automobile. 7. Organizational and social aspects. 8. Virtual environments. 			
Text Book(s)			
1.	J. Bridger R S, “Introduction to Ergonomics”, Taylor and Francis, London, 2013.		
Reference Books			
1.	Mark S Sanders, “Human Factors in Engineering and Design”, McGraw Hill, New York, 1993.		
2.	G. Karl Kroemer, Henrike Kroemer, Katrin Kroemer-Elbert, “ERGONOMICS” How to Design for Ease & Efficiency, Prentice Hall International Editions, 2001.		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		No. 57	Date 05-12-2019



Course code	ELECTRONIC PRODUCT DESIGN	L	T	P	J	C
BDE1005		0	0	4	4	3
Pre-requisite	PHY1004	Syllabus version				
		v. 1.0				
Course Objectives:						
<ol style="list-style-type: none"> 1. To implement the foundational knowledge of electronics 2. To understand the principles of electronic circuits through experimental learning. 3. Ability to impart electronics knowledge in product designs. 						
Expected Course Outcome:						
<p>The students will have,</p> <ol style="list-style-type: none"> 1. Knowledge of electric and electronic basics. 2. Basic knowledge in electronic components and properties. 3. Understanding circuits and theorems. 4. Knowledge of dynamic circuits. 5. Knowledge of semiconductors. 6. Knowledge of sensors, actuators, etc., 						
Module:1	Introduction to electricity	8 hours				
Electrons, electric current, conductors, insulator; cells & batteries, sources of power – chemical, solar, mains; current, voltage and power, power equations, Direct Current, Alternating Current; electrical circuits, pulses, waves, signals and noise.						
Module:2	Introduction to basic electronic components and properties	8 hours				
Resistance/resistor, capacitance/capacitor, Inductance/inductor, Batteries, voltage and current sources, wires and cables, switches, transducers – potentiometers & temperature sensors, fuses, Ohms law, voltmeters, ammeters						
Module:3	Introduction to Resistive Circuits	8 hours				
Resistive circuits, Kirchoff's laws, series, parallel, series-parallel circuits, voltage/current dividers, analysis of resistive circuits – node voltage, mesh current,						
Circuit theorems – Source Transformations, Superposition, Thevenin's Theorem, Norton's Equivalent Circuit, Maximum Power Transfer						
Module:4	Introduction to Dynamic Circuits	8 hours				
Energy storage in capacitors/inductors, Series and parallel capacitors/inductors, Linear (First-order) RC, RL Circuits, Response and time constants.						
Module:5	Semiconductors	8 hours				
Introduction to Discrete Semiconductors: Single Junction – Diode, Uni-junction Transistor, Multi Junction – Bipolar Transistor, Field Effect Transistor, MOSFET, Thyristors - SCR, Triacs						



Introduction to Photonic Semiconductors: Light and optics, LEDs, Light detectors – Photo resistive, PN Junction – photodiodes, phototransistors, photodiodes thyristors; Solar Cells,			
Module:6	Introduction to Integrated Circuits	8 hours	
Analog - Op-amp, voltage regulator, timer, multiplexer, comparators; Digital - Logic gate, flip flop, shift register, counter, encoder, decoder; Analog to Digital A/D, Digital to Analog D/A Conversions.			
Module:7	Introduction to basic sensors, actuators and motors	8 hours	
IR, Light, Touch, Temperature, Reed, Tilt, etc., Linear and rotational actuators, Mechanical actuators, Piezoelectric actuators, etc., DC motor, stepper motor, servo motor, AC motors, Introduction to PCBs			
Module:8	Contemporary issues:	4 hours	
Contemporary discussion with industry experts.			
Total Lecture hours:		60 hours	
Text Book(s)			
1.	Robert L. Boylestad, Louis Nashelsky, “Electronic Devices and Circuits Theory”, 11e, Pearson India.		
Reference Books			
1.	Charles K. Alexander, Matthew N.O. Sadiku, “Fundamentals of Electric circuits”, McGraw-Hill Higher Education, 2007.		
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar			
List of Experiments (Indicative)			
1.	Basics of electronics lab I: Identification of components, symbols, values, resistance color code, schematic circuits.	1 hours	
2.	Basics of electronics lab II: Getting started with Multimeter, basic tools, breadboard, proto-board, safety.	1 hours	
3.	Measuring voltage using batteries & resistances: measuring voltage of battery, resistance value of resistor, connecting resistances in series/parallel, potentiometers, and voltage divider networks.	2 hours	
4.	Resistances and capacitors in DC circuits: capacitance value of capacitor, measuring voltage and current in simple circuits, series-parallel circuits, Time-Voltage measurement of RC circuit.	2 hours	
5.	Testing of semiconductor devices: diodes, transistors.	2 hours	
6.	Basic circuits with diode: voltage reducer, half-wave rectifier, full-wave rectifier, bridge rectifier.	2 hours	
7.	Basic circuits with transistor: common-source, common-gate, common-drain.	2 hours	
8.	Experiments with transformers and inductors: Transformer testing, electromagnet.	2 hours	
9.	Experiments with simple circuits: battery, resistor, capacitor, switches, transistors and LED – simple switching circuit, relay oscillator, transistor switching.	2 hours	



10.	Experiments with Op-Amps: Summing, Differentiator, Integrator Circuits.	2 hours
11.	Experiments using 555 timer IC: Flashing LED, touch switch, audio tones, a stable multi-vibrator circuit.	2 hours
12.	Experiments using Logic gate ICs: Truth tables, building AND, OR gates using diodes and resistors.	2 hours
13.	Experiments using function generator ICs: Square, triangle & sine wave generator circuits.	2 hours
14.	Simple sensor circuits: touch, IR proximity, Automatic light switch.	2 hours
15.	Simple actuator and motor circuits.	2 hours
16.	Soldering practice.	2 hours
Total Laboratory Hours		30 hours
Mode of evaluation:		
Recommended by Board of Studies	14-09-2020	
Approved by Academic Council	No. 59	Date 24-09-2020



Course code	Advanced Form Studies	L	T	P	J	C
BDE3003		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1				
Course Objectives:						
<ul style="list-style-type: none"> • Understanding the fundamentals metaphors in product design. • Understanding various aspects of form transitions. • Ability to inspire from nature for form development 						
Expected Course Outcome:						
The students will have,						
<ul style="list-style-type: none"> 7. Ability to create forms from nature. 8. Ability to experiment with dynamic forms 9. Ability to use biomimicry as inspirations 						
Module:1		6 hours				
Form and metaphors						
Module:2		8 hours				
Nature and Form						
Module:3		8 hours				
Form in Transition – movement in time and space						
Module:4		8 hours				
Exposure and demonstration of detailing with 3D modelling software.						
Module:5		6 hours				
Inspirations from nature						
Module:6		10 hours				
Exploration of 3D forms with inspirations from nature and experimentation with dynamic forms						
Module:7		10 hours				
Biomimicry as inspirations						
Module:8	Contemporary issues:	4 hours				
.						



	Total Lab hours:		60 hours	
Text Book(s)				
1.	Maggie Macnab; Design by Nature: Using Universal Forms and Principles in Design, New Riders, 2011			
Reference Books				
1.	Rudolf Finsterwalder; Form Follows Nature: A History of Nature as Model for Design in Engineering, Architecture and Art, Springer Vienna Architecture, 2011			
2.	Alan Powers; Nature in Design: The Shapes, Colors and Forms that Have Inspired Visual Invention, Conran, 2002			
3.	Ellen Lupton, Jennifer Tobias, Alicia Imperiale, Grace Jeffers, Randi Mates; Skin: Surface, Substance, and Design, Princeton Architectural Press, 2002			
Mode of Evaluation: Assignment / FAT / Project				
Recommended by Board of Studies		24-09-2020		
Approved by Academic Council		No. 59	Date	24-09-2020



Course code	NEW PRODUCT DEVELOPMENT	L	T	P	J	C
BDE3004		0	0	4	4	3
Pre-requisite	BDE1009	Syllabus version				
		v. 1.0				
Course Objectives:						
Students will, <ol style="list-style-type: none"> 1. Understand the process to solve consumer problems by innovative products. 2. Identify the needs/ wants/ gap of consumers. 3. Demonstrate the processes of product development, and market strategy. 						
Expected Course Outcome:						
Students will be able to, <ol style="list-style-type: none"> 1. Apply marketing analysis to make informed decisions at each step of the innovation. 2. Grasp key trade-offs faced by innovative firms 3. Interact with users, collaborators, experts, and firms can be used to identify viable opportunities. 4. Master techniques which are aimed to remove risk from the NPD process. 						
Module:1		8 hours				
Overview and Introduction to New Product Development - Discipline of Innovation						
Module:2		8 hours				
Consumers and Opportunities - Analyzing Consumer Perceptions, The Customer-Centered Innovation Map						
Module:3		8 hours				
Ideation and New Product Adoption						
Module:4		8 hours				
Market Analysis - Pricing, Packaging and Demand Forecasting.						
Module:5		8 hours				



The New Product Development Process			
Module:6		8 hours	
Commercialization - A Step-by-Step Guide to Smart Business Experiments, Common Mistakes, Pricing Policies for New Products.			
Module:7		8 hours	
Strategic Considerations - Why Sustainability is Now the Key Driver of Innovation			
Module:8		4 hours	
Contemporary discussions with industrial experts and designers.			
	Total Studio hours:		60 hours
Text Book(s)			
1.	Ashby, Michael, Johnson, Kara, 'Materials and Design: The Art and Science of Material Selection in Product Design', Butterworth-Heinemann, 2002.		
Reference Books			
1.	Thompson R, 'Manufacturing process for design professionals', Thames and Hudson, London, 2007.		
2.	Garratt J, 'Design and Technology', Cambridge University Press, UK, 2004.		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies		27-11-2019	
Approved by Academic Council		No. 57	Date 05-12-2019



Course code	Sustainable Product Design	L	T	P	J	C
BDE3005		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1				
Course Objectives:						
<ul style="list-style-type: none"> • Understanding the role of design in a sustainable world • Understanding the concept of 'Less is more' 						
Expected Course Outcome:						
The students will have,						
<ul style="list-style-type: none"> 10. Ability to generate products with sustainable products. 11. Ability to create Reverse engineering of a given component 12. Understanding the role of design in a sustainable world. 						
Module:1		6 hours				
Understanding 'Form follows nature', 'Form follows Function' and 'Form follows emotion'						
Module:2		8 hours				
Understanding the concept of 'Less is more'						
Module:3		8 hours				
The role of aesthetics in society						
Module:4		8 hours				
The role of design in a sustainable world						
Module:5		6 hours				
Design in the context of a globalised world						
Module:6		10 hours				
Exposure to Indian and Asian thoughts on design						
Module:7		10 hours				
A seminar paper presentation/submission on an issue or concern of relevance to the world and the role of design in solving it.						



Module:8	Contemporary issues:	4 hours
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Total Lab hours: 60 hours		
Text Book(s)		
1.	William Lidwell, Kritina Holden, Jill Butler; Universal Principles of Design, Rockport Publishers, 2003	
Reference Books		
1.	Stefano Marzano; Creating Value by Design: Thoughts and Facts Antique Collectors' Club, 1999	
2.	Victor Papanek; Design for the Real World: Human Ecology and Social Change, Academy Chicago Publishers, 2005	
3.	Friedman, Thomas L.; The World Is Flat: A Brief History of the Twenty-first Century, Publisher: Farrar, Straus and Giroux, 2004	
Mode of Evaluation: Assignment / FAT / Project		
Recommended by Board of Studies	24-09-2020	
Approved by Academic Council	No. 59	Date 24-09-2020



Course code	TOY DESIGN	L	T	P	J	C
BDE3006		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1				
Course Objectives:						
<ul style="list-style-type: none"> 5. To understand the basic principles and basic rules of toys. 6. Ability to categorizing and classifying the toys. 7. Ability to write stories. 8. Ability to build working toy prototype and sell with secondary packaging. 						
Expected Course Outcome:						
<ul style="list-style-type: none"> 6. Create awareness on play, entertainment and education toy products. 7. Analyze the difference between traditional and modern toys. 8. Understand various idea generating techniques. 9. Understand various multifunctional toys. 10. Understand various material for toys and materials for secondary packaging. 						
Module:1		4 hours				
History of Toys - Introduction of Toy Design.						
Module:2		6 hours				
Categorising and Classifying- traditional and modern.						
Module:3		8 hours				
Basic principles and basic rules						
Module:4		8 hours				
Develop an understanding of the creative process of toy design.						
Module:5		10 hours				
Design process with a focus on designing for play, entertainment and education.						



Module:6		12 hours
Story writing on new ideas, and idea generation, concepts, mock-up modelling		
Module:7		10 hours
Actual field testing, user feedback and refinement.		
Module:8		2 hours
Contemporary discussions with industrial experts and designers.		
	Total Lecture hours:	60 hours
Text Book(s)		
<ol style="list-style-type: none"> 1. Toy Design – Chris Van Uffelen – Braun Publishing, Salenstein, 2010 2. Swedish Wooden Toys – Amy Fumiko Ogata - Yale University Press and Bard Graduate Center, New Haven, CT, 2014, 		
Reference Books		
1.	Designed for Kids - New books for children from AMMO Books, Gestalten, Paintbox Press, Princeton Architectural Press, and Schiffer Publishing - 2014	
Mode of Evaluation: CAT / Assignment / FAT / Project		
Recommended by Board of Studies	24-09-2020	
Approved by Academic Council	No. 59	Date
		24-09-2020



Course code	Course title	L	T	P	J	C
BDE3007	MEDICAL PRODUCT DESIGN	0	0	4	4	3
Pre-requisite		Syllabus version				
BDE1009		v. 1.0				
Course Objectives:						
To understand the key aspects of designing and developing products for medical applications						
Expected Course Outcome:						
The students will have,						
<ol style="list-style-type: none"> 1. Ability to apply design knowledge in observation and idea generation 2. Understanding to apply design principles pertaining to medical field for designing and developing medical products 3. Knowledge for applying standards pertaining to medical field for designing and developing medical products 						
Module:1	Classifying Medical Devices	3 hours				
Medical Devices Definitions; Classifying Medical Devices, Classification Rules; Classification						
Module:2	Design Process of Medical Products	3 hours				
Case Study; Classification Models; Classification and the Design Process						
Module:3	Regulatory Requirements	12 hours				
Design Process versus Design Control, Design Models for medical devices; Cross-Reference with Regulatory Requirements						
Module:4	Design Guidelines	12 hours				
Implementing Design Procedures: Review of Guidelines; Overall Procedure; Audit /Review Procedure; The Design Process; Implementing a Procedure for medical devices						
Module:5	Safety Consideration	12 hours				
Generating Ideas and Concepts for various medical devices and case studies; Safety aspects						
Module:6	Development of design	12 hours				
Developing the Statement of Need; Developing Product Design Specification for the device: The Product Design Specification (PDS); Finding, Extracting, and Analysing the Content						
Module:7	Approval process	3 hours				
Quality checks; FDA Approval Process; Indian Approval Process for Medical Devices						
Module:8	Contemporary issues:	3 hours				
Contemporary discussions with the experts from Industry						
	Total Lecture hours:	60 hours				



Text Book(s)			
1.	1. Peter Ogradnik, (2012), “Medical Device Design”, Academic press		
Reference Books			
1.	Biodesign: The Process of Innovating Medical Technologies. Zenios, Makower, and Yock (eds.), CU Press, 2010		
2.	Bio-Materials and Prototyping Applications in Medicine. Bartolo and Bidanda (eds.), Springer, 2008		
Mode of Evaluation: Assignment / Quiz / FAT / Project / Seminar			
Recommended by Board of Studies		14-9-2020	
Approved by Academic Council		No. 59	Date 24-9-2020



Course code	BIO-INSPIRED PRODUCT DESIGN	L	T	P	J	C
BDE3008		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
1. To implement the foundational knowledge of Biomimicry 2. To understand the principles of sustainability in nature. 3. Ability to impart nature and reliability knowledge in product designs.						
Expected Course Outcome:						
The students will have, 7. Basic knowledge in Bio-mimicry. 8. Understanding the bio-ecology. 9. Knowledge of sensors inspired from nature. 10. Knowledge of sensors in natural ecosystem.						
Module:1		4 hours				
Studying Existing Tools and Methods for Bio-Inspired Design						
Module:2		4 hours				
Cognitive Psychology of Bio-Inspired Design						
Module:3		4 hours				
Postulating the Future of Bio-Inspired Design Research						
Module:4		4 hours				
Biomimetic design through natural language analysis						
Module:5		4 hours				
TRIZ-based Methods for Bio-Inspired Design						
Module:6		4 hours				
Biomimicry Taxonomy						
Module:7		4 hours				
Biomimicry design lens and its components.						



Module:8	Contemporary issues:	2 hours	
Contemporary discussion with industry experts.			
Total Lecture hours:		30 hours	
Text Book(s)			
1.	Robert L. Boylestad, Louis Nashelsky, “Electronic Devices and Circuits Theory”, 11 e, Pearson India.		
Reference Books			
1.	Charles K. Alexander, Matthew N.O. Sadiku, “Fundamentals of Electric circuits”, McGraw-Hill Higher Education, 2007.		
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar			
List of Experiments (Indicative)		CO: 3,4,5,6	
1.	Basics of electronics lab I: Identification of components, symbols, values, resistance color code, schematic circuits.		1 hours
2.	Basics of electronics lab II: Getting started with Multimeter, basic tools, breadboard, proto-board, safety.		1 hours
3.	Measuring voltage using batteries & resistances: measuring voltage of battery, resistance value of resistor, connecting resistances in series/parallel, potentiometers, and voltage divider networks.		2 hours
4.	Resistances and capacitors in DC circuits: capacitance value of capacitor, measuring voltage and current in simple circuits, series-parallel circuits, Time-Voltage measurement of RC circuit.		2 hours
5.	Testing of semiconductor devices: diodes, transistors.		2 hours
6.	Basic circuits with diode: voltage reducer, half-wave rectifier, full-wave rectifier, bridge rectifier.		2 hours
7.	Basic circuits with transistor: common-source, common-gate, common-drain.		2 hours
8.	Experiments with transformers and inductors: Transformer testing, electromagnet.		2 hours
9.	Experiments with simple circuits: battery, resistor, capacitor, switches, transistors and LED – simple switching circuit, relay oscillator, transistor switching.		2 hours
10.	Experiments with Op-Amps: Summing, Differentiator, Integrator Circuits.		2 hours
11.	Experiments using 555 timer IC: Flashing LED, touch switch, audio tones, a stable multi-vibrator circuit.		2 hours
12.	Experiments using Logic gate ICs: Truth tables, building AND, OR gates using diodes and resistors.		2 hours
13.	Experiments using function generator ICs: Square, triangle & sine wave generator circuits.		2 hours
14.	Simple sensor circuits: touch, IR proximity, Automatic light switch.		2 hours
15.	Simple actuator and motor circuits.		2 hours
16.	Soldering practice.		2 hours
Total Laboratory Hours			30 hours
Mode of evaluation:			
Recommended by Board of Studies		14-09-2020	
Approved by Academic Council		No. 59	Date 24-09-2020



Course code	MOBILITY DESIGN	L	T	P	J	C
BDE 3009		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
<ol style="list-style-type: none"> 4. To understand the essentials of mobility and vehicle design process and be able to make use of different methods for designing related products. 5. To understand the various principles of Vehicle Ergonomics and Packaging. 						
Expected Course Outcome:						
The students will have,						
<ol style="list-style-type: none"> 1. Build knowledge on automobiles; from coach building to Mass Production 2. Understanding of vehicle design process from concept to realization 3. Develop ideas using vehicle ergonomics and Packaging 4. Knowledge of styling a vehicle with the principles of Vehicle Aerodynamics and Form. 						
Module:1		6 hours				
A brief history of automobiles; from Coach building to Mass Production						
Module:2		8 hours				
Vehicle Types, Configurations. Vehicle Construction and Architecture, Trends and Developments						
Module:3		8 hours				
Vehicle Design Process, From concept to Realization						
Module:4		8 hours				
Vehicle Ergonomics						
Module:5		6 hours				
Vehicle Packaging						
Module:6		10 hours				
Styling/ Vehicle Form, Vehicle Aerodynamics and Form, Brand Styles and Values, Styling Trends						
Module:7		10 hours				
Concept sketching and Presentation Skills, CAD Skills, Modelling Skills						
Module:8	Contemporary issues:	4 hours				
Contemporary discussion with the artists and designers.						
		Total Lab hours:	60 hours			
Text Book(s)						
	Haajanen, L. W. & Nydén, B., Illustrated Dictionary Of Automobile Body Styles, Mcfarland					



1.	& Co., Jefferson, N.C., 2002		
2.	Lamm, M. & Holls, D. A Century Of Automotive Style: 100 Years Of American Car Design, Lamm-Morada Pub. Co., Stockton, Calif., 1996		
3.	Lewin Tony, Broff, Ryan, How To Design Cars Like A Pro, Mbi Publishing Company, MN, USA, 2003		
4.	Norbye, J. P., Car Design: Structure & Architecture, Tab Books, Blue Ridge Summit, PA, 1984		
Reference Books			
1.	Sparke, P., A Century Of Car Design, Mitchell Beasley, London, 2002		
Mode of Evaluation: Assignment / FAT / Project			
Recommended by Board of Studies	27-11-2019		
Approved by Academic Council	57	Date	05-12-2019



Course code	ADVANCED SMART PRODUCT DESIGN	L	T	P	J	C
BDE4001		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
4. Students will be introduced to materials used in a circuit board. 5. Knowledge on component selection 6. Enhancing the ability to design and develop smart electronic circuits						
Expected Course Outcome:						
The students will be able to, 6. Design PCB Layouts using CAD Software 7. Assemble, test and re-work on PCBs 8. Understand the role of packaging in electronics 9. Build prototypes using protoboards.						
Module:1		6 hours				
Introduction to materials used in electronics circuit board and their properties : FR4, Copper, Solder, Solder mask, Silkscreen, Solder etc. Introduction to circuit Schematics and PCB Layout using CAD software. Calculate trace width, shape and size requirements, number of layers, routing etc.						
Module:2		8 hours				
Introduction to component selection, datasheet, and sourcing. Make a PCB using chemical etching technique : Etch resistant pens, Direct Toner Transfer, Photo-resistive laminates, etching using ferric chloride, drilling of through holes, stencil cutting etc.						
Module:3		8 hours				
PCB assembly, testing and rework : Soldering & de-soldering practice, mounting SMT & Through Hole components, continuity testing, functional testing. 3D modelling of electronic component & PCB assemblies.						
Module:4		8 hours				
Concept development of an smart electronics product : identifying need, selecting components, sourcing, Creation of schematic diagram, Generate Bill of Materials. Introduction to electronics packaging - Enclosure design, thermal management. Introduction to advanced PCB manufacturing process.						
Module:5		6 hours				
Introduction to single board computers : Raspberry Pi, Zero. Introduction to Python programming language. Make a smart product using Raspberry Pi and Arduino.						
Module:6		10 hours				
Make an prototype of a smart electronics product using protoboards : Part 1 – design, review, testing, programming.						



Module:7		10 hours
<p>Make an working prototype of a smart electronics product : Part 2 - using custom made Printed Circuit Board assemblies.</p> <p>Documentation : Circuit diagrams, parts lists, master printed circuit artwork, parts sources, software source code and documentation, mechanical drawings, assembly drawings, and all other items included as part of a project's deliverables.</p>		
Module:8	Contemporary issues:	4 hours
Contemporary discussion with industrial experts and designers.		
Total Lab hours:		60 hours
Text Book(s)		
1.	Fundamentals of Internet of Things for Non-Engineers (Technology for Non-Engineers) , by Rebecca Lee Hammons, Ronald J. Kovac, CRC Press,	
Reference Books		
1.	Make: Electronics, Second Edition, by Charles Platt, Shroff Publishers	
Mode of Evaluation: Assignment / FAT / Project		
Recommended by Board of Studies	24-09-2020	
Approved by Academic Council	No. 59	Date 24-09-2020



Course code	Advanced Computer Modelling and Simulation Techniques	L	T	P	J	C
BDE 4002		0	0	4	4	3
Pre-requisite		Syllabus version				
		v. 1.0				
Course Objectives:						
<p>The students will be able to,</p> <ol style="list-style-type: none"> 4. Create digital expression of industrial design. 5. Demonstrate higher proficiency using digital mediums for 2D and 3D modelling. 6. Apply advanced techniques to create realistic simulations of products. 						
Expected Course Outcome:						
<p>The students will have ability to,</p> <ol style="list-style-type: none"> 1. Produce digital representation of organic forms. 2. Create 3D digital modelling using varied tools and techniques. 3. Apply knowledge of advanced digital tools for product modelling. 						
Module:1		2 hours				
Introduction to 3D parametric and non-parametric software.						
Module:2		6 hours				
3D modelling – Surface modelling and techniques.						
Module:3		6 hours				
Understanding the basic principles and methods of non-parametric 3D modelling.						
Module:4		6 hours				
Explore organic product forms.						
Module:5		16 hours				
Creating organic forms for products through modelling with layers.						



Module:6		12 hours
3D rendering and simulation - Introduction to 3D rendering and simulation.		
Module:7		10 hours
3D rendering and simulation – Application of product simulation and rendering.		
Module:8		2 hours
Contemporary discussions with industrial experts and designers.		
	Total Studio hours:	60 hours
Text Book(s)		
1.	Autodesk Fusion 360 For Beginners: Part Modelling, Assemblies, and Drawings - 2019	
Reference Books		
1.	Modelling and Simulation using MATLAB - Simulink, 2ed Paperback – 2015 by <u>Shailendra Jain</u>	
2.	Modeling and Simulation Paperback – 2012 by <u>Pushpa Singh, Narendra Singh</u>	
3.	SOLIDWORKS 2019 Learn by doing: Sketching, Part Modeling, Assembly, Drawings, Sheet metal, Surface Design, Mold Tools, Weldments, MBD Dimensions, and Rendering – 2019.	
Mode of Evaluation: Assignment / FAT / Project		
Recommended by Board of Studies	27-11-2019	
Approved by Academic Council	No.57	Date 05-12-2019



Module:5	Concept Testing	4 hours
Quality Function Deployment (QFD): Customer requirement – Development of product concepts – Evaluation – Derivation of product requirement – Development process – quality control, Decision Tree Analysis - KANO Model – Weighting and Rating		
Module:6	Business Analysis	4 hours
Cost benefit analysis - Stake holder analysis		
Module:7	Contemporary issues:	2 hours
Contemporary discussion with the artists and designers.		
Total Lecture hours:		30 hours
Text Book(s)		
1.	T., Ulrich. K., Eppinger, S. D., & C., Y. M. (2020). <i>Product design and development</i> . New York, NY: McGraw-Hill Education.	
Reference Books		
1.	Trott, P. (2021). <i>Innovation management and new product development</i> . Hoboken: Pearson.	
2.	Mital, A. (2017). <i>PRODUCT DEVELOPMENT</i> . ELSEVIER.	
3.	Aspelund, K. (2015). <i>The design process</i> . London: Fairchild Books, an imprint of Bloomsbury Publishing.	
4.	Kahn, K. B. (2015). <i>Product planning essentials</i> . New York: Routledge.	
Mode of Evaluation: Assignment / Quiz /CAT / FAT		
Recommended by Board of Studies		18-02-2021
Approved by Academic Council	No.61	Date 24 Sep 2020



Course code	DESIGN MANAGEMENT	L	T	P	J	C
MGT1055		2	2	0	0	3
Pre-requisite		Syllabus version				
		1.0				
Course Objectives:						
<p>The course provides,</p> <ol style="list-style-type: none"> 1. Develop management skills enabling them to engage in innovative projects based on design as a strategic asset. 2. Ability to better utilize the tools learnt in the course and to face the challenges confidently. 3. Exposure to real world instances where design process has provided successful solutions to various challenges. 4. Exposure to the various factors to be considered when starting up a design studio on their own. 						
Expected Course Outcome:						
<p>The students will be able to,</p> <ol style="list-style-type: none"> 1. Demonstrate a high degree of professionalism characterized by initiative and creativity. 2. Express ideas effectively and communicate information appropriately and accurately using a range of media including ICT. 3. Develop working relationships using teamwork and leadership skills 4. Critically reflect on experience of significant managerial responsibility on setting up a design firm. 						
Module:1		4 hours				
Creativity and Innovation- a deeper study. -Enables the student to grasp the difference and to understand the importance and relevance in Design.						
Module:2		4 hours				
Why "Design"- perspectives from Management view.- How does Design help an industry?						
Module:3		4 hours				
Understanding Brand and its value.- Helps the student to perceive the core brand identity and value and orient design accordingly.						



Module:4		4 hours
<p>Employment vs Design Start up- Lays out the pros and cons of both, so that the student can take a balanced decision.</p>		
Module:5		4 hours
<p>Necessary skills for a start-up.- Exposes the students to several soft skills and the discipline required to start and sustain a Design venture.</p>		
Module:6		4 hours
<p>Attributes of a Designer- imparts to the students good practices relating to a design professional. People management.- How to identify and deal with the right People support. Outsourcing work...</p>		
Module:7		4 hours
<p>Financial management- Project outlays, Cash Flow etc. Marketing "design".- How to market yourself and your studio. Social Media management.- Relevance of Social Media and how to maintain and use it for promotional purposes.</p>		
Module:8	Contemporary issues:	2 hours
<p>Contemporary discussion with the artists and designers.</p>		
	Total Lecture hours:	30 hours
Text Book(s)		
1.	CHANGE BY DESIGN, Tim Brown (2009), Harper Collins Publishers, NY	
Reference Books		
1.	LOONSHOTS : How to Nurture the Crazy Ideas That Win Wars, Cure Diseases, and Transform Industries, Safi Bahcall (2019), St. Martin's Press, NY	



2.	Art of Innovation, Tom Kelly (2016), Profile Books Ltd, London		
3.	Known: The Handbook for Building and Unleashing Your Personal Brand in the Digital Age, Mark Schaefer (2017), Schaefer Marketing Solutions, USA		
Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar			
Recommended by Board of Studies	18-02-2021		
Approved by Academic Council	No.61	Date	24 Sep 2020

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