SEMESTER III

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
DS201	Design Studio-III	0-0-12-0	12	2019

Course Objectives

To Produce effective expression of ideas through 3- dimensional representation by employing different mediums and to modify a conceptual design into a specific framework for production. The students shall also employ various design development processes incorporating the tool like persona creation.

Syllabus

- The course will focus on creating the problem-solving process by analyzing the problem through different methods to arrive at alternate design concepts.
- To systematize the complete design process, from user study to the final prototype or model.

Expected Outcome

By the end of the course the student is expected to acquire the skills required to formulate persona creation and user study, develop Design iteration and formulate concepts, and create rough prototypes and model iterations based on the analysis.

Reference Books

- Kelly, T., & Littman, J. (2002). The art of innovation: lessons in creativity from IDEO. NEW. ARCHITECT, 7(6), 52-53.,
- Roozenburg, N. F., &Eekels, J. (1995). Product design: fundamentals and methods (Vol. 2). John Wiley & Sons Inc.
- Ulrich, K. T. (2003). Product design and development. Tata McGraw-Hill Education.
- Noblet, J. D., &nationales du Grand Palais, G. (1993). Industrial design: Reflections of a century. Paris: Flammarionl APCI.

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Persona creation** Mind maps, affinity mapping and temporal-spatial mapping. Semiotic analysis (Syntax-Semantic- Pragmatic)	48	30%
II	**Design Conceptualization and Visualization.** Idea sketching for alternate creative solutions Creativity and Ideation methods–Brain Storming, Synectic and Lateral thinking.	36	25%
FIRST INTERNAL EXAM			
III	**Design Development Process** Iterations, Rapid visualization and quick mock ups.	36	25%
IV	**Final prototyping**	48	20%
SECOND INTERNAL EXAM			
END SEMESTER EXAM			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
EH201	**Design and Environment**	**2-0-0-0**	**2**	**2019**

Course Objectives

- To explain the relationship between environment and design
- To analyze this relationship at the macro level of environment, society and design as well as micro level of the user and design
- To analyze the future of design in view of contemporary discussions on the environment.

Syllabus

This course prepares the student to critically analyze the relationship between design and environment at the macro as well as micro level, and to consider the future of design in view of this relationship.

Expected Outcome

A student will be able to:

- Describe the evolution of design as a discipline and its relationship to the environment including the major theories in this domain.
- Demonstrate an understanding of the relationship between design and the environment the macro geographical level as well as micro level of users.
- Illustrate the key principles of inclusive design with respect to gender, accessibility and economic disparity.
- Interpret the relationship between principles of sustainability and design.

Reference Books

- Cockburn, C., &Ormrod, S. (1993). *Gender and Technology in the Making*. SAGE Publications Ltd.
- Guha, Ramachandra. (2014). *Environmentalism: A global history*. Penguin UK.
- Norman, D. (1988). *The design of everyday things.* Basic books.
- Oudshoorn, N. E., & Pinch, T. (2003). *How users matter: The co-construction of users and technologies*. MIT press.
- Papanek, V., & Fuller, R. B. (1972). *Design for the real world*. London: Thames

and Hudson.

- Schumacher, E. F. (1973). Small is beautiful: economics as if people mattered. *London: Blond & Briggs*.
- Smith, C. E. (2007). *Design with the Other 90%.*

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Introduction** Emergence of the environment as a domain of study: A Historical perspective Major Theories of the Environment	4	15%
II	**Understanding Environment in Macro and Micro Perspectives** **Environment in the Macro Perspective** Geography as context: The relationship between geography and design **Understanding Environment in the Micro Perspective** User-centric design: theories, approaches and examples Users in the Analog and Digital Design Worlds: A comparative perspective	10	35%
First Internal Test			
III	**Inclusive Design** Relationship between design and mental, physical, economic and social inequities of users. Design and Gender Design and Accessibility. Design and Economic Disparity	10	35%
Second Internal Test			
IV	**Sustainability and Design: Designing for the future** Theories, Approaches and Examples	4	15%
End Semester Examination			

			Total Pages:
Reg No.:_____		Name:_____	

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.DES DEGREE EXAMINATION, NOVEMBER 2020

Course Code: EH201

Course Name: DESIGN AND ENVIRONMENT

Max. Marks: 40 Duration: 3Hours

PART A

Answer to the point. Illustrations carry due marks

		Answer all questions, each carries 2.5 marks. (Answer in a maximum of 5 sentences and supporting sketches)	Marks
1		Discuss Mahatma Gandhi's critiqueof industrialization as a threat to the environment.	(2.5)
2		What is the north-south divide with respect to development and environment?	(2.5)
3		Define the term "user-centric" design.	(2.5)
4		What is meant by "accessibility" in design? Provide one example to highlight your explanation.	(2.5)

PART B

Answer all questions, each carries 7.5 marks. (Answer in a maximum of 300 words with supporting sketches)

4	A)	Discuss any two key principles of E F Schumacher's theory of "Small is Beautiful." Provide at least two examples to support your answer.	(7.5)
		OR	
	B)	Examine gender-sensitive design as a key area of inclusive design. Include at least one example to support your discussion	(7.5)
5	A)	"Designing digital products is different from designing analogue products." Do you agree with this statement? Provide at least two reasons for your position.	(7.5)
		OR	
	B)	What does Donald Norman mean by the term "Affordance"? Explain the term with the help of one example.	(7.5)

PART C

Answer in a maximum of 600 words and supporting sketches, carries 15 marks.

6		Victor Papanek identifies ecological and social responsibility as the twin pillars of good design. Discuss these twin pillars. Make sure to provide examples to illustrate your argument.	(15)

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Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
DS203	Form Studies	1-0-2-0	3	2019

Course Objectives

- To assess perception, appreciation and articulation of various forms and its compositions in a defined context.
- To develop and analyze techniques of form manipulation, principles of form generation and composition.
- To analyze visual characteristics of form in accordance with the manufacturing practices .

Syllabus

Introduction to the fundamentals of design in three dimensions.

Principles of composition and articulation of form using: radii manipulation, visual elements and perceptual and aesthetic sensibility.

Gestalt Laws of form perception and organization.

Working with planes through geometric relations, form integration, textures.

Sensitization to the interplay of Dominant, Subdominant and Subordinate elements in a three-dimensional composition.

Expected Outcome

- Students will be able to critically evaluate 3 Dimensional forms.
- Students will be able to construct and develop 3 Dimensional forms and investigate the form transformations
- Students will be able to formulate form transition
- Students will be able to evaluate the ability to compare different forms and visually interpret on the basis of basic visual fundamentals and re iterate onto 3 Dimensional form.

Reference Books

- Hannah, G. G. (2002). Elements of design: Rowena Reed Kostellow and the structure of visual relationships. Princeton Architectural Press.
- Livio, M. (2008). The golden ratio: The story of phi, the world's most astonishing number. Broadway Books.
- Elam, K. (2001). Geometry of design: studies in proportion and composition. Princeton Architectural Press.
- Bonner, J. T. (Ed.). (1992). On growth and form. Cambridge University Press.
- Doczi, Gyorgy; Power of Limits, Publisher: Shambhala; Reissue edition, 1981
- Lawlor, R., & Bernstein, M. (1982). Sacred geometry: Philosophy and practice (Vol. 4). London: Thames and Hudson.
- Kepes, G. (1995). Language of Vision (Mineola, NY.

COURSE PLAN			
Module	**Contents**	**Hours**	**Marks**
I	**Introduction to 3-dimensional form.** ● Conceptual elements- Solid, plane, line. ● Relational elements- position, direction, space and gravity ● Symmetry, golden ratio, proportion	10	20
II	**Introduction to 3D geometry and their transformations.** ● Primary geometric forms**:** cuboid, tetrahedron, prism, pyramid, sphere, ellipsoid, cylinder, cone etc**.** ● Dimensional transformation ● Twist, bend.	11	30
FIRST INTERNAL TEST			
III	**3D Form transition.**	11	30

	• Additive, subtractive • Radii manipulation, edge articulation in 3D form • Identity and form- creating a family of Forms - Linear, planar, tectonic, rotational, plastic.		
IV	**Form and expression** • Visualisation and communication through forms- Movement and forces, hierarchy, order etc. • Texture	10	20
SECOND INTERNAL TEST			
END SEMESTER EXAM			

Course no.	Course Name	L-T-S-P/D	Credits	Year of

				Introduction
PS203	**Computer Aided Design**	**0-0-0-3**	**1**	**2019**

Course Objectives

- To develop effective expression of ideas through 3- Dimensional representation using different software mediums.
- To construct a conceptual design into a specific framework for production

Syllabus

Introduction to CAD/CAM Systems, Integration of Design and Manufacturing Process through a common database. Product Development Cycle using CAD/CAM Systems,

Part Modelling- Simple command extrusion based Products, Pattern based Product Model, Complex product Modelling involving different combination of the Functions

Part Assembly- Introduction to the concept of machining allowances and Tolerances, Simple and complex part assemblies

Introduction to Materials and Surface Finishes, Rendering of photorealistic views

Part Drawing- Introduction to production drawings of individual parts and assembled parts

Expected Outcome

- Students should be able to develop basic CAD sketching skills
- Students should be able to construct a 3D form using basic software operations
- Students should be able to assemble the 3D parts and surfaces constructed with respect to different techniques
- Students should be able to formulate the project outcome with their respective photorealistic views and be able to develop or extract their technical drawings.

Reference Books

- Lombard, M. (2013). SolidWorks 2013 bible. John Wiley & Sons.
- Lee, K. (1999). Principles of cad/cam/cae systems. Addison-Wesley Longman Publishing Co., Inc..
- Groover, M. P. (2007). Fundamentals of modern manufacturing: materials processes, and systems. John Wiley & Sons.
- SolidWorks, D. S., Street, W., & Waltham, M. (2015). SOLIDWORKS 2016. Online help, Accessed, 03-20.

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Introduction to CAD/ CAM, and basic sketching tool operations** ● CAD/CAM Systems, Product cycle, Application of CAD and CAM in product development. ● Understanding the basics of CAD, 3-d Planes, and Sketching in Planes, Sketching Tools and entities. ● Creating Curves, Helix, Projected Curve, Curve through Reference, Composite Curves	8	15%
II	**Single Body and Multiple Body Modelling** ● Vector and scalar modelling, Derivative Method, Limits, Fits and Tolerances. Modeling Operations- Extrude, Revolve, Sweep, Threading, Loft, Sweep, Mirroring	12	30%
FIRST INTERNAL EXAM			
III	**Part Assembly** ● Assembly configuration, Reference		30%

	geometry, Permanent and Temporary Joints, Assembly and Joinery ● Surfacing / surface modelling, Importance of surfacing, Gaussian curvature, Surface Manipulation Techniques	12	
IV	**Production Drawing and Rendering**: ● Importance of Standardization, Elements in production drawing, Different part/ assembly views, Surface Finishes, Annotations and symbols ● Rendering of parts and assemblies.	10	25%
SECOND INTERNAL EXAM			
END SEMESTER EXAM			

SEMESTER III

Elective-1

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE201	User Interface Design	1-0-0-3	2	2020

Course Objectives

To give an insight to the students to the elements of design focusing on enabling seamless and engaging user experiences.

Syllabus

- An understanding of the basics of usability, including visual design, navigation and menu design, search engine optimization, and accessibility
- How to design for efficiency and persuasion
- How to make a case for user-centred design
- How to engage the whole team in user-centred design

Expected Outcome

By the end of the course, the student should be able to apply usability concepts and methods and will tie them together with interaction and visual design.

By the end of this course, students will be equipped with the tools required to create products with outstanding user experience and usability

Reference Books

- *Bill Buxton; Sketching User Experiences: Getting the Design Right and the Right Design (Interactive Technologies); Elsevier*
- *Donald A. Norman, Living with Complexity, MIT Press, 2010*
- *Jesse James Garrett; The Elements of User Experience: User-Centered Design for the Web and Beyond; New Riders Publishing*
- *John Thackara, In the Bubble: Designing in a Complex World, The MIT Press, 2005*
- *Bruce Hanington, Bella Martin; Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions; Rockport Publishers, 2012*

Course plan			
Module	**Content**	**Hour**	**Sem Exam Mark**
I	Design thinking, design thinking process, empathise, three aspects of product experience, emotion and experience.	14	25
II	UI design patterns, page structure, organizing content for the best results, affording fluid navigation, simplifying data entry, social aspects of UI design, dark patterns, the complete user interface	14	25
First Internal Test			
III	Interaction design for usability visual design for usability, navigation & menu design, human error, messages & feedback, usability evaluation like heuristic evaluation prototyping etc. inclusive design	14	25

	strategies and tactics		
IV	An introduction to affordances, types of affordance, Bill Gaver's concept of affordances, RexHartson's concept of affordances, affordances and usability principles, brain and technology. Attention, context, intuition, recognition, thought, feedback, learning	14	25
Second Internal Test			
End Semester exam			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction

PE205	Wood – Material and Processes	1-0-0-3	2	2019

Course Objectives

- To analyze wood as a material and transition into how to plan projects and select material
- To research the behaviour, characteristics, properties, dimensionality, physical & visual potential of wood.
- To demonstrate different types of hand tools as well as portable and stationary power tools & techniques to manipulate material

Syllabus

Wood the raw material- Understanding the nature of wood. Understanding woodworking terminology. Classifications- types of Wood. Different types of wood joinery. Wood bending techniques. Layout and dividing project into components (Methods and process involved at different stages).Tool Basics- Hand tools, portable power tools and stationary power tools. Sanding and assembly. Field visits /studio visits.

Expected Outcome

- Students will be able to distinguish different varieties and properties of wood.
- Students will be able to demonstrate different wooden joineries and its application
- Students will be able to assess the processes involved in woodworking
- Students will be able to research on different wood finishes

Reference Books

- Jackson, A., & Day, D. (1996). *Collins complete woodworker's manual*.
- Frid, T. (1993). *TageFrid teaches woodworking*. Taunton Press.
- Spence, W. P. (1979). *Basic Industrial Drafting: Communicating Graphically*. CA Bennett Company.

Course Plan

Module	Contents	Hours	Sem Exam Marks
I	**Introduction**: Wood as a raw material- Wood Classification, Seasoning, Determination of moisture content, Wood preservation, Defects in timber, Indian Timber. Introduction to Hand and Power Tools.	8	20
II	**Wooden Joinery :** Wooden joineries-Angle joints, Widening Joints, Framing Joints-Butt Joints Lap Joints Halving Joints Edge-To-Edge Joints Housing Joints Mortise-And-Tenon Joints, Bridle Joints, Dowel Joints, Dovetail Joints, Board Joints	16	25
First Internal Test			
III	**Woodworking:** Wood Turning, Wood Bending-Kerfing, Steam Bending, Bending Laminates **Fixings and Fittings:** Adhesives, Fittings, Nails, Screws **Field Visits:** Visiting local Workshops to Understand working of machine tools and its applications.	20	30
IV	**Finishing and Finishes :** Surface Preparation, Finishes- Types of finishes, Characteristics of finishes, Uses of finishes, Application of finishes, Safety in the use of finishes.	12	25
Second Internal Test			
End Semester Evaluation			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE207	Textile – Material and Processes	1-0-0-3	2	2019

Course Objectives

- To appraise the behavior, characteristic, properties, dimensionality, physical & visual potential of textile.
- To equip students to demonstrate different types of tools and practices involved in fabric formation.

Syllabus

- Introduction, history of textile design.
- Classifications- based on cultural symbolisms.
- Different methods of fabric formation.
- Processes involved in dyeing and printing.
- Field visits and market surveys.

Expected Outcome

The students will be able to:

- Identify different textile designs and patterns.
- Demonstrate different methods of fabric formation.
- Distinguish between various printing processes.
- Appraise the quality of fabric.

Reference Books

- Meller, S., &Elffers, J. (2002). Textile designs: 200 years of patterns for printed fabrics arranged by motif, colour, period and design. Thames & Hudson.
- John Guy (2015). *Indian Cotton Textiles* .ACC Art Books
- Henry Wilson (2016). *Pattern and Ornament in the Arts of India.*Thames& Hudson.
- Pepin Van Roojen (2008).*Textile Motifs of India*.Pepin Press Artn Books
- MartandSingh . RtaKapurChishti & Rahul Jain.(2000) *Handcrafted Indian Textiles.*Roli Books

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Introduction**: History of textiles in India, embroidered, hand woven, dyed, printed and painted textiles. Symbolic motifs of various cultures with some examples.	8	20
II	**Methods of fabric formation** – Weaving, knitting, felting, bonding, lace making, knotting. Classification of fabrics and use, material, weaves construction, thickness, surface characteristics etc. Fabric construction methods, basic motion of weaving, looms types and parts, shuttle and shuttle-less looms and basic weaving concepts. Woven structure representation, plain weave, warp section, weft section and graphical representation. Translation of wave into fabric design, draft, denting and lifting and inter- relationships.	24	30
First Internal Test			
III	**Processes involved** : Dyeing and printing Types of dyes; direct, acid, reactive, basic, vat, azoic, sulphur, disperse and mordant dyes. Methods of dyeing. Methods of printing: - Direct, Discharge and Resist printings. Applications of Printing:-Block, Roller, Duplex, Stencil, Screen printing etc	16	25
IV	**Field visit and market survey**: Visit to a weaver's village. Market study on available fabrics, furnishings, carpets, dhurriesetc	8	25
Second Internal Test			
End Semester Exam			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE209	Advanced Typography	1-0-0-3	2	2019

Course Objectives

- This course is an advanced investigation into typography and text for verbal and visual expression. The course will explore different formats with varied applications of type, image and color. Assignments will also encourage students to develop a greater sensitivity to typographic details in order to create successful typographic messages

Syllabus

Typographic Knowledge: historical factors with reference to letterform development, awareness of typographic form used in all media. Lettering Skills & Craftsmanship: rendering, the structures, spatial relationships and nuances inherent in letterforms and within the context of words, create professional-standard comprehensives, booklets and mounted work. Applied Typesetting Knowledge, digital media manipulation techniques. Typography as verbal communication and visual communication. Three-dimensional typography, kinetic typography.

Expected Outcome

- Students will be able to critically evaluate typefaces
- Students will be able to construct and develop typefaces
- Students will be able to formulate typographic variables
- Students will be able to evaluate the ability to compare different typefaces and visually interpret type families and know about type designers.

Reference Books

- Carter Ron, Day Ben Meg Phillip, Typographic Design: Form and Communication, John Wiley & Sons, 1999
- Allen Hurlburt, The Grid, John Wiley & Sons,1998
- Jute, Andre;Grids: the structure ofgraphic design. Crans-Pres-Celigny : Rotovision, 1996
- Carter Ron, Day Ben Meg Phillip, Typographic Design: Form and Communication, John Wiley & Sons, 1999

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Introduction to type and its history.** ● Evolution of history of typography ● Recognition of typefaces, type families	10	20%
II	**Construction of type with hand.** ● Structure and anatomy of the type; x- height, ascenders, descenders, counter, cap- height, baseline, etc	11	30%
FIRST INTERNAL EXAM			
III	**Semantics of type.** ● Legibility and readability issues in type. ● Vernacular letter-forms.	11	30%
IV	**Introduction to traditional printingtechniques** ● Block printing ● Screen printing ● Hot stamping	10	20%
SECOND INTERNAL EXAM			
END SEMESTER EXAM			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE211	Information Design	1-0-0-3	2	2020

Course Objectives

To give an insight to the students on Information Design thereby enhancing their ability to collect, process, and disseminate information and to produce understanding.

Syllabus

This course introduces students to the design, presentation, and communication of information in a range of media. It focuses on information types, methods and modes of presentation, and document design and layout. The course provides a foundation of the theory and practice of information design and presentation. It aims to develop understanding of design principles in society and increase critical awareness of information presentation techniques.

Expected Outcome

On completion of this course students should be able to:

1. Demonstrate an understanding of information design and related theories and principles.
2. Demonstrate an understanding of different modes of presentation
3. Critically evaluate the design, layout and presentation of information in a range of media.

Reference Books

- *Jacobson, Robert E., and Robert Jacobson, eds. Information design. MIT press, 1999.*
- *Lipton, Ronnie. The practical guide to information design. John Wiley & Sons, 2011.*
- Baer, Kim, and Jill Vacarra. *Information design workbook: Graphic approaches, solutions, and inspiration+ 30 case studies*. Rockport Publishers, 2008.
- *Pettersson, Rune. Information design: An introduction. Vol. 3. John Benjamins Publishing, 2002.*

Course plan			
Module	**Content**	**Hour**	**Sem Exam Mark**
I	Theoretical Foundations of Information Design: Definition and the history of Information Design.	14	25
II	Types, Design, Modes of Presentation and Communication of Information in various media Knowledge Base for Information Design. Chaos, Order, and Sense-Making:	14	25
First Internal Test			
III	Information design and way finding.Tools for Thinking, Planning, and Problem Solving. Role of Information design in the Industrial Future. Human-Centered Systems	14	25
IV	Research and analysis for Information Design.Information Interaction Design: A unified field theory of design, interactivity and meaning.Collaborative Information Design.	14	25
Second Internal Test			
End Semester exam			

SEMESTER IV

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
DS202	**Design Studio IV**	**0-0-12-0**	**12**	**2019**

Course Objectives

- The course persuades students to work on the design process combining a minimum of three constraints of which one constraint can be the medium of application and to appraise how medium helps in defining the design process and its outcome.
- The students will be able to assess the efficient medium on the basis of the given brief and integrating multiple medium and its possibilities.

Syllabus

Interpreting the medium.and identifying its properties in the various previous applications which prepare students in developing or generating efficient solutions to the design problem.

Expected Outcome

- The students will examine a medium objectively and develop efficient design.
- Develop designs for efficiency and employ the same on creating working prototype of major project.

Reference Books

- Ashby, M. F., & Johnson, K. (2013). Materials and design: the art and science of material selection in product design. Butterworth-Heinemann.
- Lefteri, C. (2007). Making it: Manufacturing techniques for product design. Laurence King.

Course Plan			
Module	**Contents**	**Hours**	**Sem Exam Marks**
I	**Minor project :** Exploration and study of the characteristics of a single medium like textile, plastics, digital media etc. in replacing a conventional medium with emphasis on user needs and integrate into the design process.	72	40%
FIRST INTERNAL EXAM			
II	**Major project :** Using two or more mediums to create a design that seamlessly integrates the used mediums, The focus of this project will be on the integration of cultural patterns and environmental characteristics as generators.	96	60%
SECOND INTERNAL EXAM			
END SEMESTER EXAM			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
DS204	**Design Research**	**1-0-3-0**	**4**	**2019**

Course Objectives

- To describe the importance of research in design, its ethical dimensions in design research.
- To develop the skills to carry out research in design based on a sound of the steps and associated techniques.
- To develop the skills to produce a research document.

Syllabus

This course prepares the student to conduct their own research in design and to report their research as a research document.

Expected Outcome

A student will be able to:

- Outline the characteristics of good research in design and the ethical concerns therein.
- Design a research plan, its scope, a research problem, and implement an appropriate data collection technique.
- Identify and implement appropriate data analysis techniques and produce prototypes.
- Implement a post use analysis using appropriate methods, and produce a report of their design research.

Reference Books

- Hanington, B., & Martin, B. (2019). *Universal Methods of Design Expanded and Revised: 125 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions*. Rockport Publishers.
- Augustin, S., & Coleman, C. (2012). *The designer's guide to doing research: Applying knowledge to inform design*. John Wiley & Sons.
- Booth, W. C., Booth, W. C., Colomb, G. G., Colomb, G. G., Williams, J. M., & Williams, J. M. (2003). *The craft of research*. University of Chicago press.
- Laurel, B. (2003). *Design research: methods and perspectives*. MIT press.
- Muratovski, G. (2015). *Research for designers: A guide to methods and practice*. Sage.
- Rodgers, P., & Yee, J. (Eds.). (2014). *The Routledge companion to design research*. Routledge.

- Charmaz, K., & McMullen, L. M. (2011). *Five ways of doing qualitative analysis: Phenomenological psychology, grounded theory, discourse analysis, narrative research, and intuitive inquiry*. Guilford Press.

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Introduction**: Aims and Characteristics of research; Criteria of good research; Research paradigms; Basic types of research; Role of researcher; Ethics in research. Definition, Purpose and scope; Major areas of research In Studio: Project on Ethics in Research	12	15%
II	Planning of Research, and Techniques of Exploration and Synthesis: Qualitative and Quantitative techniques In Studio: Outline of a Term Research Project, defining a research problem, research plan, its scope, and identification and implementation of appropriate data collection techniques.	16	30%
First Internal Test			
III	Analysis, Refinement, Production, and Quality Assurance: Methods Analysis, Refinement, Production, and Quality Assurance In Studio: Identifying and implementing appropriate techniques of analysis, production of prototypes for the Term Research Project	16	30%
Second Internal Test			
IV	Post release studies and Research report writing: Techniques of conducting post release studies and report writing In Studio: Identifying and implementing appropriate methods for conducting Post research studies, production of Student Reports	12	25%
End Semester Evaluation			

			Total Pages:
Reg No.:_____		Name:_____	

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.DES DEGREE EXAMINATION, MAY 2021

Course Code: DS204

Course Name: DESIGN RESEARCH

Max. Marks: 40 Duration: 3Hours

PART A

Answer to the point. Illustrations carry due marks

		Answer all questions, each carries 2.5 marks. (Answer in a maximum of 5 sentences and supporting sketches)	Marks
1		Define Strategies and tactics in research	(2.5)
2		What is the difference between primary data and secondary data?	(2.5)
3		What are the methods used to analyse user behaviour in product design research?	(2.5)
4		What are the components of a research report?	(2.5)

PART B

Answer all questions, each carries 7.5 marks. (Answer in a maximum of 300 words with supporting sketches)

4	A)	Ethics is of paramount importance in research. Explain the role of researcher in ensuring an ethical research practice while also ensuring quality of research. Cite relevant examples to support your answer.	(7.5)
		OR	
	B)	Differentiate Qualitative and Quantitative techniques in research. Give at least one example each.	(7.5)
5	A)	Your clients have hired you to design a logo for their fast food restaurant. The logo will be used as a signage outside the restaurant and also in all printed matter including tableware. Explain how a case study based research can help you in developing your design.	(7.5)
		OR	
	B)	Your design of a prototype for an interactive agricultural interface was installed on a pilot basis in 20 different villages in Kerala. You have been asked to prepare a post release study of the prototype. Explain the structure of the study report you plan to submit.	(7.5)

PART C

Answer in a maximum of 600 words and supporting sketches, carries 15 marks.

6	A)	"Design as a social *and* spatial practice is experiencing a global revolution and requires an effective research base to feed and further key objectives." Reflect on this statement using at least three seminal examples of design research.	(15)
		****	

SEMESTER IV

Elective II

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE202	Metal – Material and Processes	1-0-0-3	2	2019

Course Objectives

- To research the behavior, characteristics, properties, dimensionality, physical & visual potential of metal.
- To demonstrate the different types of basic hand tools, cutting tools & techniques to manipulate materials.

Syllabus

Introduction, Relevance & importance of metals. Classifications- Ferrous and non-ferrous.

Heat Treatment of metals. Properties and uses of common non-ferrous metal and ferrous metals.

Different processes involved.Field visits

Expected Outcome

- The students will be able to differentiate types of metal and its properties
- The students will be able to distinguish various heat treatments and its applications
- The students will be able to demonstrate various processes involved with metal
- The students will be able to critique various available forms.

Reference Books

- Caborn, C., Cave, J., &Mould, I. (2014). *Design and technology*. Nelson Thornes.
- Ashby, M. F., & Johnson, K. (2013). *Materials and design: the art and science of material selection in product design*. Butterworth-Heinemann.
- Thompson, R. (2007). *Manufacturing processes for design professionals*.
- Swift, K. G., & Booker, J. D. (2013). *Manufacturing process selection handbook*. Butterworth-Heinemann .

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Introduction**: Different types of metals and classifications based on characteristics. Iron, steel, copper, Aluminum. Pure metals and Alloys.	8	20
II	**Various heat treatments**. Annealing, Normalizing, Hardening and Tempering. Properties and uses of various ferrous and non ferrous metals	16	25
First Internal Test			
III	**Processes involved** – forming, cutting, joining, finishing. Extrusion, Sand Casting, Die casting, Injection molding, Lathe, Spinning, Pipe bending, Milling, Panel beating, Press breaking, types of welding, types of finishing etc.	24	30
IV	**Field visit and market survey**: Various processes involved. Market study on available forms and sections.	8	25
Second Internal Test			
End Semester Evaluation			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE204	**Ceramics – Material and Processes**	**1-0-0-3**	**2**	**2019**

Course Objectives

- To research the behavior, characteristics, properties, dimensionality, physical & visual potential of clay.
- To demonstrate different types of basic hand tools, cutting tools & techniques to manipulate material.

Syllabus

Introduction, Relevance & importance of clay. Classifications- types of clay. Different processes involved – ceramics .Processes involved in pottery.Preparation Hand building techniques, Throwing, Slip casting, Press molding, Glazing etc.Field visits /studio visits.

Expected Outcome

- Students will be able to distinguish clay varieties and the preparation.
- Students will be able to demonstrate the basic hand building techniques and create products.
- Students will be equipped with the knowledge of using wheel for various uses
- Students will be able to critique firing and the application of glaze

Reference Books

- Caborn, C., Cave, J., &Mould, I. (2014). *Design and technology*. Nelson Thornes.
- Ashby, M. F., & Johnson, K. (2013). *Materials and design: the art and science of material selection in product design*. Butterworth-Heinemann
- Thompson, R. (2007). *Manufacturing processes for design professionals*.
- Quinn, A., &Hooson, D. (2012). *The workshop guide to ceramics*. Thames & Hudson.

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Introduction**:Clay and Types of Clay. Preparation of Clay- Wedging, Kneading, Weighing. Introduction to Ceramics - Ceramic Products	4	20
II	**Ceramic Techniques:**Introduction to basic tools, Hand building techniques-Pinching, Coiling, Slabbing. Clay Modelling. Forming Methods- Press Moulding, Slip Casting	8	25
First Internal Test			
III	**Introduction to wheel work:** Types of Potter's wheel, Stages of throwing - centering,opening,pulling,shaping, cutting. Designing and Fixing of Appendages-Handles, Knobs etc.	12	30
IV	**Firing and Glazing:** Drying process, Firing Process-Introduction to different types of kiln. Glazing- Types of glazes	4	25
Field Visit / Studio Visit			
Second Internal Test			
End Semester Evaluation			

Course code	Course name	P-T-S-D	Credits	Year of Introduction
PE206	Product semantics	1-0-0-3	2	2019

Course Objectives

- To apply Product Semantics as a conscious method of Design Research.
- The subject aims to integrate form design process with respect to a culture and user-group.

Syllabus

This subject deals with the headings and topics related to

- Traditional Semiotics
- The Semantic Turn: Development of Product Semantics
- Designing for a culture

Expected outcome

Students will integrate semantic perception and emotion as a part of design formulation. Adapting cognition in interactive experience. Validating classic designs employing predictive modelling. Interpreting Indian aesthetics and semantics

Reference books

- Norman, D. (2013). The design of everyday things: Revised and expanded edition. Basic books.
- Power, M., &Dalgleish, T. (2015). Cognition and emotion: From order to disorder. Psychology press.
- Chen, G. (1998). Fuzzy Logic in Data Modeling-Semantics. Constraints, and Database Design. Berlin: Springer-Verlag.
- Sanoff, H. (2016). Visual Research Methods in Design (Routledge Revivals). Routledge.
- Czikszentmihalyi, M. (1990). Flow: The psychology of optimal experience.

Course Plan			
Module	**Contents**	**Hours**	**Sem Exam Marks**
I	Introduction to Semantics and Semiotics; Communication theories, Semantic perception and constructs in Design. Emotion as a semantic construct in Design,	14	25%
II	Affective components in computing, products and visuals. Interactive experience andcognition, Flow and the semantics of experiential designs.	14	25%
First Internal Test			
III	Semantic analysis of design classics- case studies. Hedonism – Pleasure as a semantic construct in Design. Predictive models in semantics – Fuzzy based modeling.	14	25%
IV	Semantic transfer in conceptualization and visualization. Indian aesthetics and semantics – cultural and ethnographic issues.	14	25%
Second Internal Test			
End Semester Exam			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE208	**Instructional Design**	**1-0-0-3**	**2**	**2019**

Course Objectives

- To provide the background and skills needed to prepare and use a wide range of effective instructional materials.
- To provide the basic knowledge and application of the skills and techniques required for the process of addressing learning settings.

Syllabus

The processes for designing effective and efficient instruction.

Introduction to phases of system approach model of ID.

Identification of instructional goals, instructional analysis, design, development, implementation and evaluation phases.

Expected Outcome

- The students will be able to identify and summarize the steps and methods of the instructional design process.
- The students will be able to compare and contrast various instructional design perspectives.
- The students will be able to formulate instructional strategy.
- The students will be able conduct instructional analysis based on context.

Reference Books

Dick, W., Carry, L.•& Carey, J. O. (2005), The Systematic Design of Instruction, 6th Edition, MA, Boston: Allyn and Bacon.

Smith P.L.•& Ragan T.,J.(1999). Instructional Design. New York: Wiley.

Rothwell,W.J.•&Kazanas, H. C.(2008).

Mastering the Instructional Design Process : A Systematic Approach, 2nd Ed. (9780787909482)

Heinich, R., Molenda, M., Russell, J. D.,•&Smaldino, S. E. (1999). Instructional media and technologies for learning. Upper Saddle River, NJ: Prentice-Hall.

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Introduction**: Introduction to Instructional Design and ID process, assessing needs to identify instructional goals, performance analysis instructional goals, learners, context, and tools, conducting a goal analysis, intellectual skills, psychomotor skills and attitudes.	16	20
II	**Content development**: Development of skill sets for English writing, writing styles, storyboarding and script writing.	12	30
First Internal Test			
III	**Instructional Analysis**: Identifying related skills and entry behaviors, analyzing learners, prior knowledge of topic area, and attitudes toward content and potential delivery system, academic motivation. Educational and ability levels, general learning preferences group characteristics, contexts analysis, writing performance, objectives, behaviors, conditions and criteria.	16	25
IV	**Instructional methods:** Blooms Taxonomy, various school of thoughts, the design of instructions for organizations. Learning styles and theories of teaching. Technological environment and learning possibilities. Tools and Resources Printed materials Still pictures and graphics.	12	25
Second Internal Test			
End Semester Exam			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE210	Animation/VFX	1-0-0-3	2	2019

Course Objectives

- To familiarize students with the early attempts of animation.
- To familiarize the students with various approaches, methods and techniques of Animation Technology
- To develop an understanding about character creation.
- To develop basic competencies and skills needed for becoming an effective Animator.

Syllabus

Introduction to animation.

Animation fundamentals

Animation Techniques and Advancements

Visual Effects

Expected Outcome

Students will a basic understanding about managing Animation Projects from its Conceptual Stage to the final product creation.

Reference Books

- Thompson, P., & Davenport, P. (1981). *Dictionary of Visual Language*. St. Martin's Press.
- Wolchonok, L. (1969). *The art of pictorial composition*. Dover Pubns.
- Chiba, N. (2015). The World History of Animation by Stephen Cavalier. *Film & History: An Interdisciplinary Journal*, *45*(2), 39-40.
- Pinteau, P. (2004). *Special Effects: an oral history*. Harry N Abrams Incorporated.
- Taylor, R. (1996). *Encyclopedia of animation techniques*. Running Press.

Course plan			
Module	**Contents**	**Hours**	**Sem Exam Marks**
I	**Introduction**: Early attempts to imitate and reproduce motion, Cave Paintings , Persistence of Vision and Phi Phenomenon , Early Animation Devices ,Initial Attempts to Make Animation ,Photography , Motion Picture	8	20
II	**Techniques of Animation** :Different Types of Animation ,Workflows of Different Types of Animation , Preproduction, Production and Post-Production Stages ,Types of Animation , Experimental Animations, (Drawn, Stop motion), Animation Techniques (Time-lapse, Stop motion, Cut-out, Silhouette etc.)	12	30
	First Internal Test		
III	**Character development** : Cartoon Characters, Understanding Cartoon Characters ,Cartoon Constructions , Character Development, Drawing from Basic Shapes - Distortion of Proportions, Cartoon Faces, Eyes, Mouths, Hairs, Nose, Hands, Feet , Facial Expressions	16	25
IV	**Application of 3D softwares :** Different file types used in 3D animation and their applications, Basic skills for handling the selected software like transforming objects, object properties, hierarchies, pivots, etc. Modeling techniques like Spline, NURBS, Polygon and SubD- Various tools and their	20	25

	applications, Shaders and Materials, 2D and 3D textures,exterior and interior modelling.		
Second Internal Test			
End Semester Exam			

SEMESTER IV- ELECTIVEIII

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE301	**Product Ergonomics**	**1-0-0-3**	**2**	**2019**

Course Objectives

- To analyze ergonomic principles and their application in the design of work, equipment and the workplace.
- To apply principles of ergonomics into operational environments and cultural practices.
- To create ways and means to formalize standards and parameters in occupational situations.

Syllabus

Introduction to Ergonomics. Principles and practice of anthropometrics, anthropometric data. Ergonomics in the office. Ergonomics in the home. Health and safety at work.

Posture and Movement: sitting and seating & Hands and Handles. Visual performance and visual displays. Environmental factors influencing human performance. Scope for Exploration

Expected Outcome

- Students will have the knowledge of ergonomics and importance of user-friendly design
- Students will analyze and evaluate different human postures
- Students will assess the ergonomic constraints
- Students will design a space with the knowledge of ergonomics

Reference Books

- Karwowski, W., Soares, M. M., & Stanton, N. A. (2011). *Human factors and ergonomics in consumer product design: Uses and Applications*. CRC Press.
- Dreyfuss, H., Henry Dreyfuss Associates, & Tilley, A. R. (1993). *The measure of man and woman: human factors in design*. Whitney Library of Design.
- Cohen, J. L. (2014). Le Corbusier's Modulor and the Debate on Proportion in France. *Architectural Histories*, *2*(1).Pheasant, S. (2003).
- Body Space, Anthropometry, Ergonomics and the Design Work, Taylor &Francys.
- Diffrient, N.,Tilley, A. R., &Bardagjy, J. C.(1974). Humanscale 1/2/3: a portfolio of information,vol. 1.

COURSE PLAN			
MODULE	**CONTENTS**	**HOURS**	**MARKS**
I	**Introduction** Overview of ergonomics and design relevances; Man as the prime system component; Man machine interaction system and user-friendly design practices; Human compatibility, comfort and adaptability.	**10**	**10%**
II	**Posture and Movement** Biomechanical, Physiological and Anthropometric Background; Change in postures; hand and Arm postures; Lifting, Carrying, Pulling and Pushing	**16**	**30%**
FIRST INTERNAL EXAM			
III	Ergonomic Constraints Cognitive ergonomics, Information- visual, Sound and other senses; Controls for operation; Interaction Design; Environmental Factors- Noise, Vibration, Illumination, Climate	**14**	**30%**
IV	Project Work Project: Simple space design- The student has to conceptualize a space by implementing the different ergonomic factors as its constraints	**16**	**30%**
SECOND INTERNAL EXAM			
END SEMESTER EXAM			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE303	**Building Services**	**1-0-0-3**	**2**	**2019**

Course Objectives

- To develop an understanding of different building services and utilities
- To develop plumbing drawing,electrical drawing, HVAC drawing and Acoustical treatment drawings

Syllabus

Introduction to Fire protection,Plumbing and Electrical wiring of architectural Interiors. Basic concepts and detailing of spaces and layout of ducts,pipes,wiring and acoustical treatments.Preparation of drawings.Field visits

Expected Outcome

- The students will be able to analyze a fire engineering drawing.
- The students will be able to create an electrical drawing.
- The students will be able to create a plumbing drawing.
- The students will be able to examine various construction practices.

Reference Books

- Karlen, M., Spangler, C., &Benya, J. R. (2017). *Lighting design basics*. John Wiley & Sons.
- Binggeli, C. (2003). *Building systems for interior designers*. John Wiley & Sons.
- Purandare, A. D. (2017). NBC 2016, Part 4-Challenges to acceptance & implementation. *Fire Engineer*, *42*(4), 7-11.

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Fire Protection:** Fire Science Principles, Principles of combustion, Fire suppression Techniques, Fire protection and safety in building design, Building Regulation Analyzing a fire engineering drawing.	12	20
II	**Electrical Wiring:** Safety precaution Introduction to electricity, Conductor & Insulator. Wiring systems:- Tree system and distributed system Accessories used in house wiring Diagram and systems used in domestic wiring installation cleat wiring, CTS wiring, lead wiring, casing-capping wiring, conduit pipe wiring Earthing – Types. I E rule for Energy meter Installation. Lighting fundamentals,Types of lamps and luminare, Layout pattern,Lumen method of lighting design. Creation of an electrical drawing for a residential building	24	30
First Internal Test			
III	Plumbing and Sanitation – Water Quality,Elementary water supply systems and house drainage system Creation of an plumbing drawing for a residential building	16	30
IV	**Field visit and market survey**: Various products involved. Market study on available materials and construction practices	4	20
Second Internal Test			
End Semester Evaluation			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE307	**Technical Drawing and Detailing**	**1-0-0-3**	**2**	**2019**

Course Objectives

- To analyse various lines,symbols and drawing concepts.
- To develop drawings to solve design problems.

Syllabus

Design as a universal representational language for all stakeholders in the design field

Common standards in developing construction documents

Preparation of Processdrawing,Construction drawing and Presentation drawings

Technical sketching- manual and Digital, Mechanical drafting and Computer drafting

Projection systems with emphasis on Orthographic and perspective projections

Opening Schedule and Finish schedule and cross referencing techniques

Expected Outcome

- The students will be able to analyse and demonstrate various drawing concepts in 2D
- The students will be able to analyse and demonstrate various drawing concepts in 3D
- The students will be able to create compositions using softwares.
- The students will be able to prepare professional quality construction/fabrication documents.

Reference Books

- IS 15093 (2002): Construction Drawings - *Spaces for Drawing and for Text, and Title Blocks on Drawing Sheets*
- M.B.Shah., B.C.Rana. (2005). *Engineering Drawing.* First Edition. Pearson Education.
- Mitton, M. (2012). *Interior design visual presentation: a guide to graphics, models and presentation techniques*. John Wiley & Sons.

Course Plan			
Module	**Contents**	**Hours**	**Marks**
I	**Introduction to 2D drawing**: Orthographic architectural drawing Plan,Section and Elevation of interior spaces.	12	25
II	**Introduction 3D drawing**. Paraline, Isometric and Oblique drawing, 1 point,2 point and 3 point perspective drawing.	20	30
First Internal Test			
III	**CAD and Photoshop rendering:** Sheet composition and Media,use of Materials sample.	20	30
IV	**Portfolio making**: Portfolio design, Styling and presentation.	4	15
Second Internal Test			
End Semester Evaluation			

Course no.	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE309	Interaction Design	1-0-0-3	2	2020

Course Objectives

- To understand the underlying design process for finding solution for interaction design problems that can involve products, services and user environments.
- To identify basics of both analog and digital interfaces

Syllabus

- Introduction to Interaction design. Fundamental concepts used in Human Computer interactive system.
- Designing interactions for the physical, cognitive and social environments of the user. Medias and co-evolution of technology
- Understanding design in the context of digital, time-basedproducts with data storage, connectivity, sensors, actuators and multi-modal displays.
- Study of how people perceive, understand, use and experience interactive objects and spaces.
- Design of Multi modal interfaces, expressive interfaces, audio interfaces, tangible interfaces and gestural interfaces.
- Design of interactive systems, products for future use collaborative products to be used in groups, devices for rural applications and devices for use in public places.

Expected Outcome

- Students should be able to develop interactive systems that can provide a good user experience and has high usability.
- Students should be able to analyse interactive products/services/environments and interpret the good and the bad about it in terms of interaction design.

Reference Books

- Interaction Design: Beyond Human-Computer Interaction - Helen Sharp, Jenny Preece, Yvonne Rogers
- About Face: The Essentials of Interaction Design- Alan Cooper, Robert Reimann, David Cronin, Christopher Noessel
- Sketching User Experiences: Getting the Design Right and the Right Design (Interactive Technologies)- Bill Buxton
- Designing the User Interface: Strategies for Effective Human-Computer Interaction- Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven Jacobs, NiklasElmqvist, Nicholas Diakopoulos
- Seductive Interaction Design- Stephen Anderson
- An introduction to INFORMATION DESIGN - Kathryn Coates & Andy Ellison

Course Plan			
Module	**Contents**	**Hours**	**Sem Exam Marks**
I	**Introduction to Interaction design, Human Computer Interaction(HCI) systems** • Interactive system, Relationship between user experience and usability, good and poor design in the context of HCI system. • Process of interactive design- Main approaches to interactive design- User-Centric Design, Activity centred design, System Design and Genius Design. • Types of interfaces, Interface metaphors, understanding the conceptual model, mental models, concept of social interaction, Emotional interaction, cognitive aspects to interactive system • Story telling in an interactive medium, design of multi-modal, sound and conversational interfaces	14	20%

II	**Design Research, Research methodologies** • Data Gathering- goal setting, identifying participants, the relationship between the data collector and the data provider, triangulation, and pilot studies. • Data Analysis, interpretation and presentation - qualitative and quantitative analysis, visualizing and exploring the data.	10	20%
FIRST INTERNAL EXAM			
III	**Design, Prototyping, Construction and Evaluation** • Prototyping techniques, Conceptual and Concrete Design, Types of Evaluation, The Why, What, Where, and When of Evaluation. Selecting and Combining Methods	14	30%
IV	**Designing an Interactive system involving a product, service or environment** • Project: Interactive system Design, User analysis, selection of design approach,brief, selection of interfaces. The student has to conceptualize an interactive system that satisfies the design approach as well as the brief. (the final submission can be stipulated by the faculty)	18	30%
SECOND INTERNAL EXAM			
END SEMESTER EXAM			

Course no.	Course Name	L-T-S-P/D	Credits	Year of

				Introduction
PE311	**User experience(UX) Design**	**1-0-0-3**	**2**	**2020**

Course Objectives

To give an insight to the students to the elements of User Experience design and its process involving aspects of visual design, user interface design, information design, data visualization, storytelling, usability engineering, etc.

Syllabus

- Design research, methodology, human behaviour,
- Design thinking and ability to see and visualize, Creating workable prototypes, the relationship of Design,
- Aesthetics and human psychology, Relationship of science, design and technology,
- Wireframing flow chart, & design, User research and testing, Business, UX & Design management

Expected Outcome

By the end of the course, the student should be able to develop an appreciation for concepts and sensibilities of user experience design

Develop skills in the use and application of specific methods in user experience design

Improve individual and collaborative skills in design problem solving

Reference Books

- Bill Buxton; Sketching User Experiences: Getting the Design Right and the Right Design (Interactive Technologies); Elsevier
- Donald A. Norman, Living with Complexity, MIT Press, 2010
- Jesse James Garrett; The Elements of User Experience: User-Centered Design for the Web and Beyond; New Riders Publishing

- John Thackara, In the Bubble: Designing in a Complex World, The MIT Press, 2005
- Bruce Hanington, Bella Martin; Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions; Rockport Publishers, 2012

Course Plan			
Module	**Content**	**Hour**	**Sem Exam Mark**
I	Design thinking, design thinking process, empathise, three aspects of product experience, emotion and experience.	16	25
II	Introducing human-computer interaction, interaction design, cognition and perception, memory, thinking and action, evaluation,	16	25
First Internal Test			
III	User research and how to fit user research into your everyday work, the basics of qualitative user research, usability testing, semi-structured qualitative interviews, contextual inquiry, user observations	16	30
IV	Making the business case for UX.	8	20
Second Internal Test			
End Semester exam			