School of Planning and Architecture, Bhopal
Department of Design

Post Graduate Programme in Design
Master of Design Course
Syllabus of Two years (Four Semesters) course

Detailed Syllabus of Semester wise Subjects
(Thrust area: Product Design and Service Design)

Semester 1 _____

Subject	: Design Science Foundation
Subject Code	: MDES 101
Semester	: 1st
Number of Credits	: 08 credits
Student Learning Hours (in a week)	: 14 hours
Type of Examination	: Viva Voce

About : Design Foundation is offered as a common subject for all the new entrants and helps the students to understand the essence of design and the role of a designer in a contextual enquiry. The lecture and practice-based design work conducted in this subject, is broader in scope and more integrated in approach. The different professional backgrounds that the students bring to the discussions and design explorations enables all students to recognize and work in interdisciplinary ways. During the process of learning, the students are expected to realise their capacity and position themselves in the decision-making process to select any one subject area between product design or communication design for further professional study.

Content : Design as Art, Origin of Art, Design as Whole.
Cognitive Principles of Art: Visual grammar, Gestalt psychology, Visual composition, Application of Colours, Ways of seeing.
Design Thinking: a combined approach of art, human science and technology Workshop technology, Properties of Materials for Visual composition, Exploration and Realisation of Form. Design exploration with Light, Sound, Touch, Perception.
Cognitive Function of Art: Problem-Solving and Critical Thinking, Spatial Reasoning, Creativity and Ideation, Lateral thinking.
Study of co-evolution of Culture and Cognition through human-activity and space relationship. Study of the practical common-sense methods and everyday reasoning for social order.

Methodology: Lecture, Demonstration, Studio and Workshop Practice, Field Study

Reference:
What is Art? Leo Tolstoy
Design as Art, Bruno Munari
Ways of Seeing, John Berger
The Artful Mind, Mark Turner
Basic Design: the dynamics of visual form, Maurice de Sausmarez,
Art in Time: A World History of Styles and Movements, Gauvin Alexander Bailey, Alistair Rider, Matthew McKelway
Design Methods, John Chis Jones
Ethnomethodology, Harold Garfinkel
Social Psychology, Michael A Hogg & Joel Cooper
Critical Design in Context, Matt Malpass
Lateral thinking, Edward de Bono

Subject	: History of Art, Design and Technology
Subject Code	: MDES 102
Semester	: 1st
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Written

About : History of Art and Design provides a critical overview on evolution of human life as a pattern of art, and impact of design on evolving material culture in different art forms at various regional markets with the support of trade and economic production system. The subject explores a detailed history of various art forms, objects and environments those reflected the changing socio-economic patterns according to the timeline. Students are expected to study a case, based on historical perspectives. It enables the students to analyse past movements to inform contemporary practices, leading to fostering critical thinking and visual literacy.

Content: Medieval art, Renaissance art, Neo-classical, Rococo, Mughal, Rajasthani, Symbolism, Impressionism, Realism, Art Nouveau, Romanticism, Bauhaus, De Stijl, Suprematism, Constructivism, Cubism, Fauvism, Pop art, Abstract Expression, Postmodernism, Digital art.
Key Technological Drivers: Materials, Energy, Communication, Transportation.
Middle Ages and Renaissance,
Consumer Revolution: Design, Commerce and Trade,
Mechanization and Industrial Revolution, Design reform, Politics and Society, Theory and Design, Popular Styles, Design after Modernity, Information age.

Methodology: Lecture, Demonstration, Studio and field study

Reference: Design in Context, Penny Sparke
The Consumer Revolution, Michael Kwass
Art in Time: A World History of Styles and Movements, Gauvin Alexander Bailey, Alistair Rider, Matthew McKelway
A History of Communication Technology, Philip Loubere
History of Technology Volume 6, A. Rupert Hall and Norman Smith
History of Diplomacy and Technology: From smoke signals to artificial intelligence, Jovan Kurbalija
Nexus: A Brief History of Information Networks from the Stone Age to AI, Yuval Noah Harari

Subject	: Design Management, Innovation and Entrepreneurship
Subject Code	: MDES 103
Semester	: 1st
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Written

About : The objective of Design Management is to help the students to bridge the gap between creativity and business strategy. It guides the students to manage different professional teams through role playing game, to innovate marketable design solutions through strategic thinking, brand management, management of design processes and communication strategy.

Content: Fundamentals of Design Management: Management of business performance, Startup and Entrepreneurship, understanding Professional Service Firm, Client-consultancy relationships, Patenting process, Innovation management process.
Value of Design: Individual and Organizational creativity, Marketing as differentiation, Innovation as coordination through design, Strategy as transformation through design.
Design Management in Practice: Design firm, Operational, Functional and Strategic design management, Design strategy vs Strategic Design,

Methodology: Lecture, Demonstration, Studio work, group discussion and field study

Reference: Design Management, Brigitte Borja De Mozota
Brand Gap, Marty Neumeier
Design Management, Sotiris T Lalaounis
Innovation Management and New Product Development, Trott

Subject	: Computational Design and Basic AI
Subject Code	: MDES 111
Semester	: 1st
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Time Problem and Viva Voce

About : The subject offers an opportunity to initiate a dialogue between intuition and technology, creativity and computation. Various software in this subject may help the students not only build the model of a design concept, but a responsive system, an entity of a set of rules that adapts and evolves with each parameter one can adjust. Students can collaborate with technology and test variations, analyse performance and refine outputs through iterative loops. The subject creates an opportunity to extend till Extended Reality also.

Content: Modeling of curves, Surfaces and solid manipulation of CAD models, Parametric modeling, Project in re-engineering a product using computer tools for reverse engineering geometry, Design evaluation, Modification, prototyping and manufacturing drawing.

Methodology: Lecture, Demonstration, Studio and field study

Reference: CAD/CAM, I. Zeid

Semester 2 _____

Subject	: Product Design Research Methods
Subject Code	: MDES 211
Semester	: 2nd
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Written

About : The objective of the subject to equip the students with different types of research methods not only to enquire about the characteristics of object but also how to make that object in a context. This subject can help the students to decide how and when to deploy the methods effectively.

Content: Design research, Class theoretical, Field theoretical, Research into design, Research for design, Research through design,
Looking: ethnography, phenomenology, grounded theory, photo and video diaries, shadowing, a day in life, personal belonging, future forecasting, trend spotting, scenarios, product autopsy, case study sketching,
Learning: visual and material culture study, cultural probes, competitor product analysis, cultural comparison, action research, role play, mind mapping, case study sampling,
Asking: questionnaire and survey, focus and unfocus groups, interviews, brand DNA analysis, Market research, image and mood board, perceptual mapping, personas, product collage,
Making: sketch model, mock-ups, paper prototype, experience prototypes,
Testing: scenario testing, user trials, material testing, safety testing,
Evaluation: choosing the right methods, checklists, external decision making, intuition, crowdsourcing, matrix evaluation,

Methodology: Lecture, Demonstration, group discussion, Studio and field study

Reference: Research Methods for Product Design, Alex Milton and Paul Rodgers
Research for Designers, Gjoko Muratovski
Doing research in design, Christopher Crouch and Jane Pearce
Critical Design in Context, Matt Malpass
Ethnomethodology, Harold Garfinkel

Subject	: Product Semantics
Subject Code	: MDES 212
Semester	: 2nd
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Written

About : The subject makes the students review the history of semantic concerns in design and learn the axiomatic relationships between human-centered design methods and cultural meanings.

Content: Brief history of product semantics, basic concepts of human-centered design, meanings of artifacts in use, design methods and science for design.

Methodology: Lecture, Demonstration, group discussion, Studio and field study

Reference: The product semantics, Klaus Krippendorff

Subject	: Applied Ergonomics
Subject Code	: MDES 213
Semester	: 2nd
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Written

About : The subject shows the importance of ergonomics in human-centred design. It helps the students to learn different methods of measuring the human physical and cognitive capabilities of human performance fit for different types of daily life works and take decision about the applicability and appropriateness of those measured data in a case study.

Content: Introduction to ergonomics and its application.
Definition of three major areas: Physical ergonomics, Cognitive ergonomics and Environmental ergonomics
Generating different tools to evaluate ergonomic data, measurements and information gathering, ergonomics standards, observational techniques, rating scales, questionnaires, use of models and simulation
Documentation, synthesis and evaluation of ergonomic data, ergonomic assessments of data collection from user study with respect to ergonomics
Design project involving ergonomic design research

Methodology: Lecture, Demonstration, group discussion, field study and practical

Reference: Human factors in Engineering & Design, Mark S. Sanders, & Ernest J. McCormick
Indian Anthropometric Dimensions, Debkumar Chakrabarti,
The Measure of Man and Woman: Human Factors in Design, Alvin R. Tilley, Henry Dreyfuss

Subject : Product Function and Innovation
Subject Code : MDES 214
Semester : 2nd
Number of Credits : 04 credits
Student Learning Hours (in a week) : 07 hours
Type of Examination : Time Problem and Viva Voce

About : The objective of the subject is to design of product function sensitive to product-user interaction. The subject helps the students to identify the requirements in the user-product interaction and demonstrate the specific pattern of mechanical functions to deliver in the physical medium.

Content: Observation of user's activity
Function-Task Interaction method
Visualization of future user-product interaction in physical medium
Design of mechanism for specific product functions
Validation of functional prototype

Methodology: Lecture, Demonstration, collaborative learning and workshop practice

Reference: Advanced Mechanism Design, Vol I & II, George N. Sandor and Arthur G. Erdman
Mechanism in modern engineering design, Vol I - IV, Ivan I Artobolevsky,
Engineering design methods: strategies for product design, Nigel Cross

Subject : Materials and Manufacturing
Subject Code : MDES 215
Semester : 2nd
Number of Credits : 04 credits
Student Learning Hours (in a week) : 07 hours
Type of Examination : Written

About : The subject intends to explore and apply the knowledge of materials and manufacturing techniques for production of a specific product form in detail. Students can experience the effectiveness of characters and properties of different materials through workshop manufacturing techniques.

Content: Manufacturing processes of various product forms with different materials, Properties of various materials, selection of materials based on properties and context of use, design for manufacturing and assembly

Methodology: Lecture, Demonstration, collaborative learning and workshop practice

Reference: Making it: manufacturing techniques for product design, Chris Lefteri
Materials selection in Mechanical Design, Ashby, M.F.
Plastics Technology, Theory, Design and Manufacturing, Pattons, W.J.
Industrial Plastics, Terry L Richardson & Erik Lokensgard

Subject	: Product Design Project
Subject Code	: MDES 216
Semester	: 2nd
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Viva Voce

About : The aim of the subject is to learn the total process of product design starting from problem identification to conceptualization and validation of final concept through different evaluation techniques for target user groups. This process of design consists of many methods applicable at different segments of the product design process. Students can apply this process while designing any product in future.

Content: Design thinking, Meaning of things, Problem identification, Analysis of problem/s, Experimentation of theoretical model, Blue Ocean strategy, Design brief, SWOT analysis, Product strategy and positioning, Ideation and conceptualization, Evaluation techniques and Finalization of concept/s. Functional prototype to a scale and validation, Manufacturing drawings.
Sustainable Consumption and Production.

Methodology: Lecture, Demonstration, collaborative learning and workshop practice

Reference: The fundamental of product design, Richard Morris
How Designers Think, Bryan Lawson
Design thinking, Robert Curdale
Emotional design, Donald A Norman
Design Methods, John Cris Jones

Semester 3 _____

Subject : Summer Internship
Subject Code : MDES 301
Semester : 3rd
Number of Credits : 02 credits
Student Learning Hours (in a week) : 04 hours
Type of Examination : Viva Voce

About : The aim of the subject is to make the students familiarise with the industrial processes of professional practices as well as being accustomed to professional communication with clients.

Content: Identification of scope of Industrial work in a particular industrial organization, Joining and reporting to organization, completion of work atleast for sixty hours, documentation of work done by the student in the organization, documentation of industrial processes by the student.

Methodology: The internship will be done in the summertime between M.Des 1st yr and M.Des 2nd year. The student can join the organization and complete the tasks given to them atleast for sixty hours as a trainee. The student may also visit the industry and document the industrial production processes as a part of training. The students will present their training work infront of the jury in viva voce.

Subject : Consumer Experience Research and Service Branding
Subject Code : MDES 302
Semester : 3rd
Number of Credits : 04 credits
Student Learning Hours (in a week) : 07 hours
Type of Examination : Written

About : The subject helps the students to study the research methods to explore the possible experiences, the target users are looking for in consumption and production activities of service process and design the brand communication to connect to the target user groups.

Content: Finding the target user, Cognitive load theory, Choosing research methods to capture the experience, Description of experiences, Design of brand for target experience of user groups.

Methodology: Lecture, Demonstration, collaborative learning and studio work

Reference: User experience research, Marty Gage & Spencer Murrell
The art and science of UX design, Anthony Conta
Brand Gap, Marty Neumeier
Brand Management Checklist, Brad Vanauken

Subject	: Product Systems and Architecture
Subject Code	: MDES 311
Semester	: 3rd
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Written and Viva Voce

About : The subject helps the students to study the mechanical packaging and composition of the parts of the interior systems of a product as per user-product interaction and to analyse the usability aspects for maintenance design and repairability from human-centred design point of view.

Content: Application of Mechatronic aspects for electro-mechanical system
Introduction to Sensors & Transducers, Actuating devices
Function-Task-Interaction method
Control panel design according to experience of product-user interaction
Product architecture and product platform
Product architecture typology
Architecting process
Product affordance
Product performance and user experience
Case study from different product segments

Methodology: Lecture, Demonstration, collaborative learning and workshop practice

Reference: The role of product architecture in the manufacturing firm, Karl T. Ulrich,
Mechatronics: Electronic control systems in mechanical and electrical engineering, W. Bolton,
Mechatronics System Design, Devdas Shetty & Richard A. Kolk
Basic Electrical and Electronics Engineering, D.P. Kothari & I J. Nagrath
Designerly ways of knowing, Nigel Cross

Subject	: Speculative Design and Application of Artificial Intelligence
Subject Code	: MDES 312
Semester	: 3rd
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Written and Viva Voce

About : The subject helps the students to learn various predictive methods to visualize the future consumption scenario. The students will be involved in experimental study and discussion, debate about the kind of future people may adapt or reject. The subject informs about application of Artificial Intelligence as a methodology for prediction,

Content: Future Thinking, Historical study on past events, cultural shifts, technological trajectories, Critical & Discursive Design, Speculative Prototyping, Introduction to Artificial Intelligence, Use of AI in speculative techniques.

Methodology: Lecture, Demonstration, collaborative learning and studio work

Reference: Imagined Communities, Benedict Anderson
The imaginary Institution of Society, Cornelius Castoriadis
Modern Social Imaginaries, Charles Taylor
Publics and Counterpublics, Michael Warner
Speculative Everything: Design, Fiction and Social Dreaming, Anthony Dunne and Fiona Raby
Artificial Intelligence: A Guide for Thinking Humans, Melanie Mitchell

Subject	: Human-activity Systems Integration
Subject Code	: MDES 314
Semester	: 3rd
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Written

About : The subject informs the students about the growing complexity of problems due to interconnectedness of societies at macro level and the need to introduce systemic concept to connect those macro level problems to micro level daily life human activities. It helps the students to study the difference between natural systems and a group of human activities associated with each other for a purpose, considered as human-activity systems. It also helps the students to understand the rights of an observer to choose to view a set of human activities as a system for a purpose, if he wishes to do so (like second order cybernetic). The subject informs the students about various theoretical construct to build the systemic model for problematique situations.

Content: System view of life, Making choices under risk: Prospect Theory, Heuristics and Biases, Social preference, Behavioural Game theory, Impatience and Temptation, Different field-based research methods for problem study, Soft Systems thinking models, Understanding of the problems at different levels of consumption and production systems, Activity theory, Conceptualisation of solutions at human-activity systems level.

Methodology: Lecture, Demonstration, field study, collaborative learning and studio practice

Reference: Systems view of life, Fridtjof Capra
Designing social systems in a changing world, Bela H. Banathy
Systems Thinking, Systems Practice, Peter Checkland
Sustainable Every day, Ezio Manzini
Development as freedom, Amartya Sen
An introduction to Behavioural Economics, Nick Wilkinson and Matthew Klaes
Microeconomics, Katz Morgan and Rosen
Perspectives on activity theory, Yrjo Engestrom, Reijo Miettinen, Raija-Leena Pnamaki

Subject	: Phygital Systems
Subject Code	: MDES 313
Semester	: 3rd
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Viva Voce

About : The objective of the subject is to study the necessary emergence of integrating physical environment based human activities with digital convenience. Students will work both on physical environment design based on macro-ergonomic data and rational usage of digital systems like IoT, AI/ML, cloud-based workflows, and data-driven design. Students can study the change in behaviour of users through prototype experience of phygital systems.

Content: Design of physical environment to support service setup, Introduction to emerging technology, Digital technology as a design material, Internet of Things, Product interaction and Haptics, Behavioural impact of technological change.

Methodology: Lecture, Demonstration, collaborative learning and workshop practice

Reference: The Fourth Industrial Revolution, Klaus Schwab
Artificial Intelligence: A Guide for Thinking Humans, Melanie Mitchell
Designing Connected Products, Claire Rowland
Human Haptic Perception: Basics and Applications, Martin Grunwald
Smart Materials & New Technologies, D. M. Brown

Subject	: Service Design Methods
Subject Code	: MDES 315
Semester	: 3rd
Number of Credits	: 04 credits
Student Learning Hours (in a week)	: 07 hours
Type of Examination	: Written

About : The objective of the subject is to make the students understand the complexity of problems in consumption and production system and essence of service as a design solution to the problems. The design methods of service will be introduced to derive the detailing of human activities as part of service. At the end, the service/s will be standardised and detail blue print of service activities will be created.

Content: Sustainable consumption and production, Relation between sustainability and service, Characteristics and types of Services, Systemic mapping of service activities, Service design methods, Standardization and evaluation of service/s, Detailing of concept and prototyping.

Methodology: Lecture, Demonstration, field study, collaborative learning and studio practice

Reference: Service Management, Richard Norman
Service Design Process & Methods, Robert Curedale
Product-Service Systems and Sustainability, Ezio Manzini and Carlo Vezzoli
Mapping Methods 2, Robert Curedale

Semester 4 _____

Subject : Final Design Project
Subject Code : MDES 401
Semester : 4th
Number of Credits : 18 credits
Student Learning Hours (in a week) : 31 hours
Type of Examination : Viva Voce

About : The objective of the subject is to study different situational contexts of daily life and analyse the complexity of a problem for deriving a design brief. Students can apply their knowledge from previously learned subjects and create viable solution/s with functional prototype/s through various design methods. At the end, they can validate the prototype.
Students may collaborate with industries to conduct their final design project. In that case, if required, they may stay out of campus to complete their project.

Content: Problem analysis and identification, Experimentation of theoretical model, Design strategy and market positioning, Design brief, SWOT analysis, Design specifications, Ideation and conceptualization, Evaluation techniques and Finalization of concept/s. Functional prototype to a scale and validation, Manufacturing drawings.

Methodology: Experimentation and Demonstration, Collaborative learning and Workshop practice

Subject : Design Seminar and Report Writing
Subject Code : MDES 402
Semester : 4th
Number of Credits : 02 credits
Student Learning Hours (in a week) : 04 hours
Type of Examination : Viva Voce

About : The objective of the subject is to learn and write the report for design project. Different types of referencing systems will be adopted in writing. At the end the students will present the report in the form of seminar.

Content: Content of report, Introduction, Literature review, Problem study and analysis, Primary and Secondary study, Theoretical experimentation, Design brief and specification, Ideation and concepts, Detailing of Concepts, Finalization of concept through evaluation methods, Final Prototype and validation, Manufacturing Drawing. Bibliography and References.

How to do: Lecture, Demonstration and Studio practice

Methodology: Different types of reference systems