ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

MINOR

Subject: DESIGN THINKING

w.e.f. AY 2023-24 onwards

COURSE STRUCTURE

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SEMESTER-II

COURSE 1: INTRODUCTION TO DESIGN THINKING

Theory Credits: 4 4 hrs/week

UNIT I : FUNDAMENTALS OF DESIGN THINKING

Design Thinking Process: Types of the thinking process, Common methods to change the human thinking process, Design thinking: Definition, Origin of design thinking, Importance of design thinking, Design vs Design thinking, Problem solving, the need of design thinking; An approach to design thinking, Design thinking Process model, Design thinking tools.

Case Studies: General, Engineering and Service applications

Activities: Identify an Opportunity and Scope of the Project
Explore the possibilities and prepare a design brief

UNIT II: EMPATHIZE AND DEFINE

Design thinking phases, how to empathize, Role of empathy in design thinking, the purpose of empathymaps, Things to be done prior to empathy mapping, Activities during and after the session, Understanding empathy tools: Customer Journey Map, Personas.

Define- Methods of Define Phase: Storytelling, Critical items diagrams, Define success

Activities: Apply the methods of empathizing and Define Phases Finalize the problem statement

UNIT III: IDEATION

Challenges in idea generation, Visualize, Empathize, and Ideate method, Importance of visualizing and empathizing before ideating, Applying the method,

Create Thinking, Generating Design Ideas, Lateral Thinking, Analogies, Brainstorming, Mind mapping, National Group Technique, Synectic’s, Development of work, Analytical Thinking, Group Activities. Ideation Tools: How Might We? (HMW), Storyboard, Brainstorming. What is design innovation? A mindset for innovation, and asking "What if?" asking "What wows?" and "What works?"

Activities- Apply the methods of Ideate Phase: Generate Lots of Ideas

UNIT IV: PROTOTYPING

What is a prototype? - Prototyping as a mindset, prototype examples, prototyping for products; Why we prototype? Fidelity for prototypes, Process of prototyping- Minimum Viable prototype.

Activities: Apply the Methods of the Prototype Phase: Create prototypes for selected ideas
UNIT V: TESTING PROTOTYPES

Prototyping for digital products: What’s unique for digital products, Preparation; Prototyping for physical products: What’s unique for physical products, Preparation; Testing prototypes with users. Create a Pitch-Plan for scaling up-Road map for Implementation, Fine-tuning and Submission of the project report

Activities: Collect feedback; iterate and improve the ideas

Present your solution using the Storytelling method

Text Books:

2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons Inc
SEMESTER-III

COURSE 2: USER EXPERIENCE DESIGN

Theory  Credits: 4  4 hrs/week

Course Objectives: To learn User Experience of any Product, Application and its Service.

Course Outcome: Will be knowing the experiential practices of product and services

Unit -I: Experiments to learn how users interact with product

Unit -II: Research method tools

Unit-III: Data visualization and wire framing

Unit -IV: Usability testing technique

Unit -V: Communicating and implementing UX deliverable

Text Books:


References:

1. A Project Guide to UX Design: For user experience designers in the field or in the making by Russ Unger, Carolyn Chandler.
2. The Elements of User Experience: User-Centered Design for the Web and Beyond by Jesse James Garrett.
SEMMESTER-IV

COURSE 3: INTEGRATED DESIGN RESEARCH

Theory  Credits: 4  4 hrs/week

Course Objectives:

Putting the research areas together into one framework, a generic design research methodology that links the research questions together and provides support to address these in a systematic way.

Broad overview of the generic concepts of design, design research and the need for a design research methodology.

Course Outcomes:

Upon completion of this course, the student’s research into design helps to;

1. Develop a holistic understanding of the area of design research
2. Carry out design research effectively and efficiently.

Unit I

Introduction to Design: Design Research, Main Issues, Lack of Overview of Existing Research, Lack of Use of Results in Practice, Need for a Design Research Methodology.

Unit II

Introduction, Methodological Framework, Types of Research Within the DRM Framework, Representing Existing and Desired Situations, Graphical Representation, From Reference Model to Impact Model, Success Criteria and Measurable Success Criteria.

Unit III

Identifying Overall Topic of Interest, Clarifying Current Understanding and Expectations; Clarifying Criteria, Main Questions and Hypotheses, Criteria, Research Questions and Hypotheses; Selecting Type of Research, Formulating Overall Research Plan, Overall Research Plan

Unit IV

Developing Design Support; Types of Design Support; Types of PS; A Systematic PS Process; Task Clarification; Conceptualization; Determining Main Functions, Generating and Selecting Support Concepts, Introduction Plan; Elaboration.

Unit V:


Publishing Results; Various Forms of Publication and Their Intent, Overall Structure of a Thesis; Approaches to Help Structure a Thesis, Table of Content Approach, Presentation Approach, Methodical Design Approach, Question and Answer Approach

Text Books

SEMESTER-IV

COURSE 4: INTRODUCTION TO WEB DESIGN

Theory                          Credits: 4               4 hrs/week

Course Objectives:

From the course, the student will learn

- Translate user requirements into the overall architecture and implementation of new systems and Manage Projects and coordinate with the Client.
- Write backend code in PHP language and Write optimized front end code HTML and JavaScript.
- Understand, create and debug database related queries and Create test code to validate the applications against client requirements.
- Monitor the performance of web applications & infrastructure and Troubleshooting web applications with a fast and accurate resolution.

UNIT-I:


CSS: Cascading style sheets, Levels of Style Sheets, Style Specification Formats, Selector Forms, The Box Model, Conflict Resolution, CSS3.

UNIT-II:

Java script - Introduction to Java script, Objects, Primitives Operations and Expressions, Control Statements, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions, Fundamentals of Angular JS and NODE JS

Angular Java Script- Introduction to Angular JS Expressions: ARRAY, Objects, Strings, Angular JS Form Validation & Form Submission.


UNIT-III:

Working with XML: Document type Definition (DTD), XML schemas, XSLT, Document object model, Parsers - DOM and SAX.

AJAX A New Approach: Introduction to AJAX, Basics of AJAX, XML Http Request Object, AJAX UI tags, Integrating PHP and AJAX.
UNIT-IV:

PHP Programming: Introduction to PHP, Creating PHP script, Running PHP script. Working with variables and constants: Using variables, Using constants, Data types, and Operators.

Controlling program flow: Conditional statements, Control statements, Arrays, functions.

UNIT-V:

Web Servers- IIS (XAMPP, LAMP) and Tomcat Servers. Java Web Technologies Introduction to Servlet, Life cycle of Servlet, Servlet methods, Java Server Pages.

Database connectivity – Servlets, JSP, PHP, Practice of SQL Queries.

Introduction to Mongo DB and JQuery.


Text Books:


Reference Books:

1. Ruby on Rails Up and Running, Lightning fast Web development, 1st Edition, Bruce Tate, Curt Hibbs, Oreilly, 2006
SEMESTER-V

COURSE 5: SUSTAINABLE PRODUCT DESIGN

Theory                                    Credits: 4                                    4 hrs/week

Course Objectives:

- Design guidelines that help prolong the life of a product and minimize its environmental impact.
- Enable product design for end-of-life (EoL) objectives such as reuse, recycling and remanufacturing.
- Determine the cost of designing sustainable products.
- To address all three pillars of sustainability—environmental conservation, social sustainability, and economic sustainability.

Unit I:


Unit II:


Unit III:

Designing for Assembly, Definition and Importance of the Assembly Process, Definition of Design for Assembly, Types of Assembly Methods, Different Modes of Assembly and Design Guidelines to Facilitate Them, Methodologies for Evaluating DfA,

Unit IV:

Unit V:


Text Book:

SEMESTER-V

COURSE 6: HUMAN COMPUTER INTERACTION

Theory Credits: 4 4 hrs/week

UNIT - I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT - II


UNIT- III


UNIT- IV

HCI in the software process, the software life cycle Usability engineering Iterative design and prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction

UNIT- V

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right.
TEXT BOOKS:
1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech. Units 1, 2, 3

REFERENCE BOOKS:
1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.