ఆంధ్రప్రదేశ్ కేంద్రీయ విశ్వవిద్యాలయం

आंध्रप्रदेश केंद्रीय विश्वविद्यालय

Central University of Andhra Pradesh

Jnana Seema, Ananthapuramu

School of Interdisciplinary and Applied Sciences

Department of Computer Science

Vidya Dadati Vinayam

(Education Gives Humility)

PG Diploma in Design Thinking

w.e.f. Academic Year 2025 - 2026

CONTENTS

PG Diploma in Design Thinking

Introduction to the Programme

The Diploma in Design Thinking is designed to equip students with the knowledge, skills, and mindset required to approach complex problems creatively and develop innovative solutions. In today's rapidly evolving professional and technological landscape, organizations increasingly seek individuals who can combine empathy, creativity, and analytical thinking to address challenges effectively.

Design Thinking is a human-centered, iterative approach to problem-solving that emphasizes understanding user needs, ideation, prototyping, and testing solutions. This programme introduces students to the principles and practices of Design Thinking, enabling them to develop solutions that are not only innovative but also practical and user-focused. Students learn to apply structured methods to uncover problems, generate ideas, build prototypes, and implement solutions across a wide range of industries, including business, technology, healthcare, education, and social services.

The programme emphasizes experiential learning, theoretical concepts, case studies, and collaborative activities. Students gain experience working in teams, engaging with real-world problems, and developing solutions that are feasible, viable, and desirable. By fostering creativity, critical thinking, and problem-solving skills, the programme prepares learners to become effective innovators, design leaders, and change-makers in diverse professional contexts.

Programme Objectives:

The key objectives are:

- To introduce students to the fundamental concepts and processes of Design Thinking.
- To develop a human-centered mindset, focusing on understanding user needs and behaviors.
- To enhance creative problem-solving skills, encouraging ideation, experimentation, and innovation.
- To foster collaboration and teamwork, enabling students to work effectively in interdisciplinary environments.
- To cultivate analytical and critical thinking, integrating insights from research, observation, and data analysis.
- To prepare students for professional application of Design Thinking in business, technology, social innovation, and other sectors.
- To encourage ethical and sustainable innovation, considering social, economic, and environmental impact.

Learning Outcomes:

Upon successful completion of the programme, students will be able to:

- Understand the Design Thinking process and apply it systematically to solve complex problems.
- Conduct user research and empathy exercises to identify needs, pain points, and opportunities.
- Generate creative solutions through ideation techniques such as brainstorming, mind mapping, and sketching.
- Evaluate and iterate solutions based on user feedback, usability testing, and data-driven insights.
- Collaborate effectively in multidisciplinary teams to co-create solutions.
- Apply design principles to enhance product, service, and process innovation.
- Communicate ideas and solutions effectively, using visual, and verbal, storytelling methods.
- Integrate ethical and sustainable considerations into the design and innovation process.
- Demonstrate entrepreneurial thinking, identifying opportunities for innovation in professional and social contexts.

Programme Structure

Sl. No	Course Code	Title of the Course	Total Credits	Credits Distributions		
				L*	T*	P*
Semester– I						
1	PDDTH101	Introduction To Design Thinking	4	4	--	--
2	PDDTH102	Integrated Design Research	4	4	--	--
3	PDDTH103	Business Research and Data Analysis	4	4	--	--
4	PDDTH104	MOOC/NPTEL/SWAYAM	3	--	--	--
5	PDDTH105	MOOC/NPTEL/SWAYAM	3	--	--	--
6	PDDTH106	Internship	2	--	---	--
		Total	20			

Semester– II						
Sl. No	Course Code	Title of the Course	Total Credits	Credits Distribution		
				L*	T*	P*
1	PDDTH201	Big Ideas with Design Thinking	4	4	--	--
2	PDDTH202	AI-Driven Design Thinking for Innovation	4	4	--	--
3	PDDTH103	MOOC/NPTEL/SWAYAM	3	--	--	--
4	PDDTH104	MOOC/NPTEL/SWAYAM	3	--	--	--
5	PDDTH105	*Project Work	6	--	--	--
		Total	20			

* Project Work is compulsory and have to submit to the department one week before second semester examination. Department faculty will allot a supervisor to each student at the end of first semester.

***L:** Lectures, ***T**: Tutorials, ***P**: Practical

Note: 1. MOOCs are chosen by the student based on the availability of the courses offered on SWAYAM & other related platforms as suggested/recommended by the Department.

2. The desired changes may be made by the Department in the programme structure as and when necessary with the prior approval of the BOS.

Credit Distribution

Semester	Total Credits
Semester-I	20
Semester-II	20
Total	**40**

Important Information to the Student

1. Eligibility:
   - **i.** CUAP/Non-CUAP students pursuing/completed any PG/PhD Programmes can enroll for PG Diploma Programme offered by the University.
   - **ii.** Non-CUAP students shall have to appear for an Entrance Examination conducted by the University.
   - **iii.** A student can enroll for as many PG Diploma Programmes as he/she wishes.
2. The minimum duration for completion of any Postgraduate Diploma Programme is two semesters (one academic year).
3. Maximum duration to compete the programme is two years.
4. A student should have minimum 75% attendance in classes, seminars, practical/ lab in each course of study without which he/she will not be allowed for the Semester-end examinations.
5. All theory courses in the programme shall have Continuous Internal Assessment (CIA) component of 40 marks and a Semester-end examination component of 60 marks. The minimum pass marks for a course is 50%.
6. The student has to appear 3 CIA tests of 15 marks each per semester in each course from which the best 2 performances shall be considered for the purpose of calculating the marks. A record of the continuous assessment is maintained by the department. The remaining 10 marks are awarded based on participation and performance in:
   - Assignments
   - Class presentations
   - Seminars
   - Quizzes
7. A student should pass separately in both CIA and the Semester-end Examination.
8. Semester-end examination shall consist of objective type questions, descriptive type questions, short answer questions and case studies or any others.
9. A student failing to secure the minimum pass marks in the CIA is not allowed to take the semester-end examination of that course. She/He has to redo the course by attending special classes for that course and get the pass percentage in the internal tests to become eligible to take the semester-end examination.
10. Students failing a course due to lack of attendance should redo the course.

Semester I

Course Code: PDDTH101	Introduction To Design Thinking	L	T	P	C
Total Hours: 60		3	-	-	4

Course objectives

To expose the student with state-of-the-art perspectives, ideas, concepts, and solutions related to the design and execution of projects using design thinking principles. To prepare the mindset and discipline of systemic inspiration driven by a desire to identify new sources of ideas, and new models especially outside their regular working atmosphere.

Course Outcomes:

CO 1: Understand the principles and stages of the Design Thinking process, including Empathize, Define, Ideate, Prototype, and Test.

CO 2: Apply empathy-based research methods to identify user needs, behaviors, and pain points in real-world contexts.

CO 3: Generate diverse and innovative ideas using structured ideation techniques and creative thinking strategies.

UNIT I: **14 Hours**

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: **12 Hours**

Design thinking phases, how to empathize, Role of empathy in design thinking, the purpose of empathy maps, 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: **14 Hours**

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: **8 Hours**

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: **12 Hours**

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:

1. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, HarperCollins Publishers Ltd.
2. Idris Mootee, Design Thinking for Strategic Innovation,2013, John Wiley & Sons Inc

Reference Books:

1. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press, 2009.
2. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand - Improve - Apply", Springer, 2011
3. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley & Sons 2013
4. Jeanne Liedtka, Andrew King, Kevin Bennett, "Book - Solving Problems with Design Thinking
5. Ten Stories of What Works" (Columbia Business School Publishing), 2013
6. Maurício Vianna, Ysmar Vianna, Isabel K. Adler, Brenda Lucena, Beatriz Russo, "Design thinking: Business Innovation" MJV Press, 2011
7. Burgelman, Christensen, and Wheelwright, "Strategic Management of Technology and Innovation"5th Edition, McGraw Hill Publications, 2017

Similar courses

Design thinking (iimb.ac.in)

Design thinking certification at MIT Sloan (Online program)

Design thinking | Systems Design Engineering | University of Waterloo (waterloo.ca)

Course Code: PDDTH102	Integrated Design Research	L	T	P	C
Total Hours: 60		3	-	-	4

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:

CO 1: Apply interdisciplinary research methods to investigate complex design challenges, integrating insights from social, technological, and cultural contexts.

CO 2: Formulate and articulate design hypotheses grounded in empirical evidence, user needs, and contextual analysis.

CO 3: Demonstrate the ability to synthesize research findings into innovative design strategies, prototypes, or narratives that address real-world problems.

UNIT I **08 Hours**

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 **10 Hours**

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 **12 Hours**

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 **16 Hours**

Understanding Design, Schools of Thought, Types of DS-I , DS-I Process Steps; Reviewing Literature, Identifying Literature, Summarizing Literature; Determining Research Focus, Identifying and Defining Factors and Links of Interest, Formulating Research Questions and Hypotheses, Techniques for Refining Research Questions and Hypotheses, Developing Research Plan for DS-I.

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 **14 Hours**

Evaluating Design Support Evaluation, Importance of Evaluation, Types of Evaluation in DRM, Synthesis Example, DS-I Versus DS-II, Existing Evaluation Approaches; Types of DS- II, Initial DS-II, Comprehensive DS-II, Systematic DS-II Process, 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:

1. Blessing, LTM, Chakrabarti, A. DRM A Design Research Methodology, Springer- Verlag, London, 2009.
2. Brenda Laurel, "Design Research Methods and Perspectives", MIT Press, Cambridge, 2004

Reference Books:

1. Design Research: Methods and Perspectives. Edited by Brenda Laurel.
2. The Reflective Practitioner: How Professionals Think in Action, By Donald A. Schön
3. Design Thinking Research: Building Innovation Eco-Systems. Edited by Hasso Plattner, Christoph Meinel & Larry Leifer.
4. Research Methods for Product Design, By Alex Milton & Paul Rodgers.

Course Code: PDDTH102	Business Research and Data Analysis	L	T	P	C
Total Hours: 60		3	-	-	4

Course objectives:

The Business Research and Data Analysis course aims to develop analytical thinking and research skills for solving complex business problems. It focuses on designing research frameworks, collecting and interpreting data, and applying statistical tools to support strategic decision-making.

Course Outcomes:

CO 1: Design and execute structured research studies using appropriate methodologies to investigate business problems and opportunities.

CO 2: Apply statistical and analytical tools to interpret data, identify patterns, and derive actionable insights for decision-making.

CO 3: Communicate research findings effectively through reports, visualizations, and presentations tailored to diverse business audiences.

UNIT I **14 Hours**

Business Research: An Introduction: Introduction to Basic Concepts; Stages in the Business Research Process; Problem Identification and its importance, Research Objectives, Types of Research; Significance of Business Research in Decision Making; Business Research in Practice; Ethics in Research; Research Bias.

UNIT II **10 Hours**

Research Designs & Data Types: Classification of Research Designs; Exploratory, Descriptive and Conclusive Research Designs; Causal Research; Primary Data- Nature, Types, Means & Issues in Obtaining Primary Data Secondary Data- Nature, Sources and Advantages.

UNIT III **14 Hours**

Measurement, Attitude Scales and Questionnaire Design: Concept of Measurement, Scales of Measurement–Their Types & Properties; Measurement of Attitudes & Scaling Procedures; Questionnaire Design and Testing; Questionnaire and Opinionnaire.

UNIT IV **10 Hours**

Sampling, Hypothesis Testing and Data Preparation, Sampling Theory, Designs and Issues; Central Limit Theorem; Hypothesis Testing-Concept &Procedures; Data Preparation Process.

UNIT V **12 Hours**

Data Analytics: Introduction to SPSS; Comparison with MS-Excel; Analyzing data using SPSS - T-test, ANOVA, Correlation & Factor Analysis; Interpretation of results; Reporting Research Findings.

Text and Reference Books:

1. Marketing Research by N K Malhotra and S Dash (6th Edn). Pearson.
2. Research Methods for Business by U Sekaran and R Bougie (7th Edn). Wiley
3. Market Research by E Mooi, M Sarstedt and I Mooi-Reci. Springer
4. Research Methodology C R Kothari and G Garg. New Age Int'l Publishers.
5. Marketing Analytics by W L Winston. Wiley. Wiley-Vch Publication, 2010.

Semester II

Course Code: PDDTH201	Big Ideas with Design Thinking	L	T	P	C
Total Hours: 60		3	-	-	4

Course Objectives:

To cultivate the ability to identify, generate, and refine transformative ideas using design thinking principles, with a focus on discerning value, risk, and innovation potential. Foster teamwork across diverse backgrounds to solve complex, real-world problems.

Course Outcomes:

CO 1**:** Apply design thinking principles to identify and solve user-centered problems.
CO 2: Conduct empathetic research to uncover latent needs and insights.
CO 3: Frame actionable problem statements and generate innovative solutions.

UNIT I **12 Hours**

Feature vs. Idea, differentiating incremental improvements from transformative concepts, Definitions: Feature, Idea, Innovation, Case studies: Feature creep vs. breakthrough thinking, Value mapping: Utility vs. originality, Exercises: Reverse engineering features into ideas, Reflection: When does a feature become an idea?

UNIT II **14 Hours**

Qualities That Set Big Ideas Apart, understanding what makes an idea “big” in terms of impact, scalability, and resonance, Criteria: Novelty, relevance, feasibility, emotional resonance, Cultural and social value in idea formation, Examples of big ideas across domains (tech, education, social innovation), Group activity: Idea audit and ranking, Tagline creation: Expressing the essence of a big idea

UNIT III **10 Hours**

How to Generate Big Ideas, Techniques and mindsets for ideation, Design thinking stages: Empathize, Define, Ideate, Heuristics and lateral thinking, Creative constraints and provocations, Role of intuition and insight, Workshop: From problem to possibility

UNIT IV **12 Hours**

Identifying No-Brainers vs. Big Bets, evaluating risk, effort, and strategic value, Decision matrices: Effort vs. impact, No-brainers: Low-risk, high-certainty ideas, Big bets: High-risk, high-reward ideas, Portfolio thinking: Balancing safe and bold moves, Simulation: Pitching ideas to different stakeholders

UNIT V **12 Hours**

Ideation Methods, How to Diverge and Converge, Expanding and refining idea pools, Divergent thinking: Brainstorming, SCAMPER, mind mapping, Convergent thinking: Affinity mapping, dot voting, synthesis

Text Books & Reference Books

1. Design Your Thinking, Pavan Soni, A practitioner's guide to applying design thinking across domains, with Indian context and examples
2. HBR's 10 Must Reads on Design Thinking, Harvard Business Review, Tim Brown, Clayton Christensen, Indra Nooyi. A collection of seminal articles on innovation, idea generation, and strategic thinking
3. A More Beautiful Question, Warren Berger, Explores the power of inquiry in unlocking big ideas - ideal for Unit III & V
4. Designing Your Work Life, Bill Burnett & Dave Evans, Applies design thinking to personal and professional growth - useful for ideation and convergence

Web Materials & Online Resources

1. IDEO U Blog: Design Thinking Book Recommendations] (https://www.ideou.com/en-gb/blogs/inspiration/ideou-design-thinking-book-recommendations?_pos=5&_sid=7ff9d1698&_ss=r) – A rich list of 28 books curated by IDEO experts, categorized by mindset, industry, and impact
2. Interaction Design Foundation] (https://www.interaction-design.org/) – Offers free and paid courses, articles, and toolkits on design thinking, ideation, and innovation
3. Stanford d. school Resources] (https://dschool.stanford.edu/resources) – Downloadable guides and methods for divergent/convergent thinking, prototyping, and framing big ideas
4. MIT Open Course Ware – Design Thinking] (https://ocw.mit.edu/) – Free lecture notes and assignments from top-tier design thinking courses

Course Code: PDDTH202	AI-Driven Design Thinking for Innovation	L	T	P	C
Total Hours: 60		4	-	-	4

Course Objectives:

Introduce students to design thinking frameworks enhanced by AI tools for creative problem-solving. Enable data-informed empathy, ideation, and prototyping to drive user-centric innovation. Foster the ability to integrate AI insights into iterative design processes for impactful solutions.

Course Outcomes:

CO 1: Learners will demonstrate the ability to use AI platforms to create rapid prototypes.

CO 2: They will conduct virtual testing, analyze feedback using AI tools, and iterate designs for improved user experience.

CO 3: Integrate AI-driven insights into strategic innovation frameworks to scale solutions and influence organizational change.

UNIT I: **12 Hours**

Fundamentals of Design Thinking: Empathy, Ideation, Prototyping, Testing. Evolution of AI in creative and strategic domains. Synergies between AI and Design Thinking. Case studies: AI-enhanced innovation at Google, IBM, and IDEO. Tools overview: ChatGPT, Midjourney, DALL·E, Runway ML, Figma AI.

UNIT II: **12 Hours**

Human-centered research methods: Interviews, observations, ethnography. AI tools for sentiment analysis, behavioral prediction, and persona generation. Empathy mapping with AI augmentation. Data visualization and clustering for insight discovery. Ethical considerations in AI-driven user research.

UNIT III: **12 Hours**

AI-assisted brainstorming: Prompt engineering and generative ideation. Using AI for lateral thinking and concept expansion. Clustering and evaluating ideas with ML algorithms. Storyboarding and scenario simulation using AI tools. Collaborative ideation platforms: Miro, Notion AI, Whimsical.

UNIT IV: **12 Hours**

Rapid prototyping using AI: Text-to-image, code generation, UI mockups. Virtual testing environments and simulations. AI in usability testing and feedback analysis. Iterative refinement using reinforcement learning principles. Tools: Figma AI, Uizard, Adobe Firefly, User Testing AI.

UNIT V: **12 Hours**

AI in strategic foresight and trend analysis. Business Model Innovation using AI-enhanced canvases. Scaling solutions: Predictive analytics and deployment strategies. Organizational culture for AI-driven innovation. Capstone project: Solve a real-world challenge using AI + Design Thinking.

Text Book:

1. Artificial Intelligence for Design Thinking: A Guide to Human-AI Collaboration" by Christian V. Huber (Springer, 2022)

Reference Books:

1. Design Thinking for Strategic Innovation" by Idris Mootee (Wiley, 2013)
2. Solving Problems with Design Thinking" by Jeanne Liedtka et al. (Columbia Business School Publishing, 2013)
3. AI and Design Thinking: A Practical Guide to Human-Centered Innovation" by Gavin Doughtie (Routledge, 2021)
4. Human + Machine: Reimagining Work in the Age of AI" by Paul R. Daugherty and H. James Wilson (Harvard Business Review Press, 2018)