Indian Institute of Technology Kanpur

Proposal for a New Course

1. **Course No:**

2. **Course Title:** Cognitive Human Factors and Applied Psychology for Designers

3. Per week Lectures: **3**(L), Tutorial: **0** (T), Laboratory: **0** (P), Additional Hours [0-2]: **0** (A), Credits (3*L+2*T+P+A): **9** Duration of Course: **Full Semester**

4. **Proposing Department/IDP:** Department of Design
   Other Departments/IDPs which may be interested in the proposed course: Cognitive Science, and other associated departments involved in research involving human interaction with technology

   Other faculty members interested in teaching the proposed course: None

5. **Proposing Instructor(s):** Vivek Kant

6. **Course Description:**

The aim of this course is to provide a comprehensive foundation in cognitive human factors and applied psychology for designers, enabling them to understand the scientific basis of human behavior and use these principles to design. This course is envisioned as *supplementing the content of* other existing courses from a psychological perspective in design, such as communication design, interaction design, among others, and is not a replacement for any of these. This course should ideally be taken alongside other design courses so that students can understand design practice in the context of scientific principles of human behavior. The course will introduce the principles of human behavior and its applicability in design problems. The course will present an overview of the subject as well as direct students in case they wish to delve deeper into certain areas using small design exercises or design projects.

a. **Course Objectives:**
   - At the end of the course, the student will be able to examine and explicate the link between psychology and design
   - Apply analysis techniques to use in various design projects ranging from communication to industrial design.
   - Use various principles and methods from cognitive human factors and applied psychology for design in various application sectors.

b. **Course Content:**
   90 mins per session: 18 lecture sessions + 9 studio sessions

S.No.	Topic and Details	Sessions (Lectures & Studio)
1	**Cognitive and psychological sciences as a basis of design practice — Foundations I** - Relation between science and design - Design Science as a basis for design - Psychology as a basis for design - Cognition and its function in ecology - Sensation, Perception, Attention, Memory, Language, Thinking and Problem Solving, Action - Methods of cognitive psychology and their application to Design practice and design research	1
2	**Cognitive and psychological sciences as a basis of design practice — Foundations II** - Psychological Viewpoints and their implications for design - Behaviorist - Cognitivist and Information Processing paradigms - Alternatives to Cognitivist viewpoints and post-cognitivist approaches	1
3	**Psychological Principles in Communication Design and Data Visualization** - Sensation and Perception - Attention, Selective Attention and Change Blindness and its implications for Design - Elements of Communication Design and its psychological foundations in the Gestalt approach to vision - Psychological basis for color - Figure ground and Perceptual grouping - Applications in design of logos - Applications in visual hierarchy - Other applications in visual communication - Psychology of Art	3
4	**Studio Practice 1,2: Practice examples and applications in Communication design and Data Visualization**	2
5	**Psychological Principles in Type Design and Interaction Design** - Human Factors challenges and Issues in Type Design - Readability on Print and Electronic media - Speed Accuracy and Visual Comfort - Legibility on Print and Electronic media - Size Distance relationships in Screen and Banner design - Visual Attention and Decision making using type design in Interaction Design	3
6	**Studio Practice 2: Practice examples and applications in Interaction Design**	1

7	**Psychological Principles in Interaction Design and industrial/product design I** - Visual Ergonomics of Displays and Controls - Design with limited information - Design for complex information - Display Design for interaction with products - Cognitive basis of design of alarms and feedback - Cognitive Workload	3
8	**Studio Practice 3,4: Practice examples and applications in Interaction related to products I**	1
9	**Psychological Principles in Interaction Design and industrial/product design II** - Affordances and products - Psychological basis of product semantics - Emotional Design of products - Issues in Text Entry - Fitts Law - Luminance and Contrast of displays - Design and arrangement of displays and controls - Principles of Control Room Design	2
10	**Studio Practice 5,6: Practice examples and applications in Interaction related to products II**	1
11	**Task Analysis Methods for Design I** - Control Task Analysis - Applied Cognitive Task Analysis - Hierarchical Task Analysis - Other Associated Task Analysis Methods	2
12	**Studio Practice 7,8: Task analysis Methods I**	2
13	**Task Analysis Methods for Design II** - Analysis of Situated Actions - Activity analysis - Core Task Analysis	2
14	**Studio Practice 9,10: Task analysis Methods II**	2
15	Psychology and Emerging Frontiers in Design: - Psychological basis for design of Human-AI interaction and other systems - Psychological basis for design with non-human entities - Other new topics related to design	1
	Total Sessions (Lectures + Studio)	27 sessions
	Total Hours = 27 * 1.5 hrs	40.5 Hrs

Assignments (studio+ term paper presentation) 60% + final exam 40 %

a. **Pre-requisites, if any:** None. (Preference will be given to students who have completed a previous course on design)

b. **Short Summary:**
The course will present a detailed understanding of psychological principles and its applicability in design of human-centric systems. It will also provide an overview of cognitive human factors and psychological principles in relation to various disciplines of design such as interaction design, communication design, industrial design, amongst others.

c. **Books:**

- Stone, N. J., Chaparro, A., Keebler, J. R., Chaparro, B. S., & McConnell, D. S. (2017). Introduction to Human Factors: Applying Psychology to Design (1st ed.). Boca Raton: CRC Press.
- Groome, D. & Eysenck, D. (2025). *An Introduction to Applied Cognitive Psychology* (3rd ed.). Psychology Press.
- Arnheim, R. (1954). *Art and visual perception: A psychology of the creative eye*. Univ of California Press.
- Goldstein, E. B. (2022). Sensation and perception (11th ed.). Belmont, CA: Wadsworth/Cengage.
- Ware, C. (2012). Information visualization: perception for design. Elsevier.
- Nemeth, C. P. (2004). *Human factors methods for design: Making systems human-centered*. CRC press.
- Norman, D. (2007). *Emotional design: Why we love (or hate) everyday things*. Basic books.
- Journal Papers from the disciplines of Psychology and Human Factors Journals

Dated: 5 April 2026

Proposers: Vivek Kant

DPGC Convener: