INSTITUTE OF DESIGN
Nirma University
Product and Interaction Design, Semester VI

Institute:	**Institute of Design**
Name of Programme:	**Bachelor of Design**
Course Code:	**3DD311MC26**
Course Title:	**Human Machine Interaction**
Course Type:	(■ Core/ ☐ Value Added Course/ ☐ Departmental Elective/ Institute Elective/ University Elective/(Open Elective Any other)
Year of introduction:	**Academic Year 2026-27**

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Course Learning Outcomes (CLO):

At the end of the course, the student will be able to:

1. Analyse human cognitive, physical and emotional factors influencing interaction with digital and physical systems (BL 4)
2. Design user-centered interfaces using usability principles, accessibility guidelines and interaction patterns (BL 6)
3. Develop functional human-machine interaction prototypes integrating hardware, software and interface design (BL 6)
4. Evaluate interactive products using usability testing methods and recommend design improvements based on user data (BL 5)

Content: **Total Teaching hours: 90 Hrs.**

Units	Content	Teaching hours
Unit 1	**Introduction to Human Machine Interaction (HMI)** • Evolution of HMI • Human factors, cognition, and ergonomics • User behaviour and interaction principles • Analysis of real-world HMI products	**12 Hrs.**
Unit 2	**Advanced Interaction Technologies:** • Touch, gesture, voice, and haptic interaction • Internet of Things (IoT) interfaces • Smart products and embedded interaction • AI-assisted interaction systems • Hardware–software integration	**12 Hrs.**
Unit 3	**Simulation-Based Design and Virtual Prototyping:** • Electronic circuit simulation • Mobile app development • AR/VR/MR simulation • Design refinement through virtual prototyping	**24 Hrs.**

Unit 4	**Human-Machine Interaction Design Project:** • Define a brief for HMI device. • Development of a working Proof of Concept by integrating Hardware, Software and Interfaces • Usability testing and analysis • Design refinement • Final prototype development	**42 Hrs.**

Self-Study	**Maintain a journal of the following:** • Analyse everyday physical and digital interaction systems • Review examples of accessible and inclusive interface design • Study usability-testing methods through case studies • Explore emerging interaction technologies and interfaces
Class Test	**1**
Suggested Readings/ References	**Books** 1. Shneiderman, B., Plaisant, C., Cohen, M., Jacobs, S., Elmqvist, N., & Diakopoulos, N. (2022). *Designing the user interface: Strategies for effective human-computer interaction* (6th ed.). Pearson. 2. Dix, A., Finlay, J., Abowd, G. D., & Beale, R. (2004). *Human-computer interaction* (3rd ed.). Pearson. 3. Sharp, H., Preece, J., & Rogers, Y. (2019). *Interaction design: Beyond human-computer interaction* (5th ed.). John Wiley & Sons. 4. Norman, D. A. (2013). *The design of everyday things* (Revised and expanded ed.). Basic Books. 5. Johnson, J. (2020). *Designing with the mind in mind: Simple guide to understanding user interface design guidelines* (3rd ed.). Morgan Kaufmann. 6. Buxton, B. (2007). *Sketching user experiences: Getting the design right and the right design*. Morgan Kaufmann.