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

Institute:	**Institute of Design**
Name of Programme:	**Bachelor of Design**
Course Code:	**3DD313ME26**
Course Title:	**Smart Wearables**
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 smart wearable devices and the principles, interaction concepts and human factors associated with them (BL 4)
2. Apply knowledge of sensors, actuators, microcontrollers, and electronic components to develop wearable interaction concepts (BL 3)
3. Develop functional prototypes by integrating form, materials, electronics, and Human-Centered Design principles (BL 6)
4. Evaluate the prototypes based on feedback of the user and recommend design improvements (BL 6)

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

Units	Content	Teaching hours
Unit 1	**Introduction to Smart Wearables:** • Introduction and evolution of Smart wearable products and systems • Types and applications of wearable devices • Wearables in healthcare, fitness, sports, fashion, safety, entertainment, and other relevant industries • Understanding the relationship between body, technology, and environment • Wearability, ergonomics, comfort, and aesthetics • Case studies of existing wearable products • Analysis of successful and unsuccessful wearable products	**12 Hrs.**
Unit 2	**Wearable Electronics, Sensors and Materials** • Introduction to wearable electronic systems • Microcontrollers for wearable applications • Introduction to wearable-specific development platforms	**24 Hrs.**

	• Sensors: motion, temperature, light, pressure, proximity, heart rate, environmental sensing etc. • Actuators and feedback: LEDs, vibration motors, buzzers, displays etc. • Flexible and conductive materials: Conductive thread, conductive fabric, and flexible circuits • Power sources and power management for wearable devices • Basic wireless communication: Bluetooth and Wi-Fi • Safe integration of electronics with the human body	
Unit 3	**Design of Smart Wearable Devices** • Selection of a real-world problem/opportunity and application area • User and Contextual Research • Design brief and product attributes • Concept generation and design development • Body mapping and placement of wearable devices: design for movement, comfort and accessibility • Form exploration and enclosure design • Development and troubleshooting of functional prototypes	**30 Hrs.**
Unit 4	**Prototyping and Testing** • Functional wearable product development: Integration of electronics into final product design • Usability and performance testing: User evaluation and feedback • Design refinement: Final prototype development and presentation	**24 Hrs.**

Self-Study	**Maintain a journal of the following:** • Study contemporary wearable products and applications • Explore sensors and components suitable for wearable applications • Observe ergonomics, comfort and body placement in existing wearables • Review examples of wearable interfaces and feedback systems
Suggested Readings/ References	**Books** 1. Igoe, T. (2011). *Making things talk* (2nd ed.). Maker Media. 2. Hartman, K. (2014). *Make: Wearable electronics: Design, prototype, and wear your own interactive garments*. Maker Media. 3. Seymour, S. (2008). *Fashionable technology: The intersection of design, fashion, science, and technology*. Springer. 4. Sharp, H., Preece, J., & Rogers, Y. (2019). *Interaction design: Beyond human-computer interaction* (5th ed.). John Wiley & Sons. 5. Norman, D. A. (2013). *The design of everyday things* (Revised and expanded ed.). Basic Books.

	Additional resource: Research and resources on e-textiles and wearable computing by Leah Buechley and collaborators.

w.e.f. AY 2026-27 onwards