

## NIRMA UNIVERSITY

<b>Institute:</b>	<b>Institute of Design</b>
<b>Name of Programme:</b>	<b>Bachelor of Design in Industrial Design</b>
<b>Course Code:</b>	<b>IDTH 416</b>
<b>Course Title:</b>	<b>Advanced Interaction Technologies</b>
<b>Course Type:</b>	Core
<b>Year of introduction:</b>	2021

### Credit Scheme

L	T	Practical component				C
		LPW	PW	W	S	
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### Course Learning Outcomes (CLO):

At the end of the course the students will :

1. Generate work in emerging domains of Interaction Design
2. Build an understanding of Human Machine Interaction
3. Design GUI in Open source Programming language like Python
4. Develop Program in Python using Open Source Smart Boards like Raspberry Pi
5. Illustrate Programming skills for Touchscreen and Digital Displays

### Syllabus:

**Total Teaching hours: 90**

Unit	Syllabus	Teaching hours
Unit-I	<b>New tools for Interaction: AR, VR &amp; IoT</b> <ol style="list-style-type: none"> <li>1.1 Introduction to Augmented Reality (AR) and Virtual Reality (VR)</li> <li>1.2 Wireless Interaction Systems and Internet of Things (IoT)                             <ol style="list-style-type: none"> <li>1.2.1 Voice Assistant Systems ex. Alexa and Google Home</li> <li>1.2.2 Communication with Machines using IoT</li> </ol> </li> <li>1.3 Introduction to Open Source Smart boards ex. Raspberry Pi                             <ol style="list-style-type: none"> <li>1.3.1 Machine-to-Machine Interaction using Camera and OpenCV (an open source computer vision and machine learning software library)</li> <li>1.3.2 Designing a GUI using Open Source Programs ex. Python</li> </ol> </li> </ol>	20



Unit-II **Human Machine Interface**

- 2.1 Introduction to Human Machine Interface (HMI) and Human-Computer Interaction (HCI) Design
- 2.2 Interacting with Open Source Digital Displays ex. NEXTION. 40
  - 2.2.1 Designing a Simple HMI for HOME Automation System
  - 2.2.2 Designing a Simple HMI for a Digital Toy
  - 2.2.3 Designing a Robot Interaction panel- Case Study of Human Robot Interaction

Unit-III **Broad Understanding of AI and ML**

- 3.1 Introduction to Artificial Intelligence (AI) and Machine Learning (ML) 10
- 3.2 Importance of AI in Industrial Design
- 3.3 Brief Introduction of Industry 4.0
- 3.4 Applications and Advantages of AI and ML

Unit-IV **Artificial Intelligence Algorithms**

- 4.1 Intelligent Algorithm Development using Design Perspective 20
- 4.2 Color and Shape Detection Algorithms
- 4.3 Introduction to Simple digital Game Design

Self Study: -

Suggested Readings/ References:

1. *Augmented Reality and Virtual Reality* by M.Claudia and Timothy Jung, Springer, ISBN 978-3-319-64027-3, Volume 0, 2017
2. *Future Interaction Design* by Pertti Saariluoma, Hannakaisa Isomäki, Springer Publications, ISBN 978-1-84800-385-9, Volume 1, 2009
3. *Artificial Intelligence with Python*, by Prateek Joshi, Packt Publications, Jan 2017
4. *Artificial Intelligence in Practice*, Matt Ward, Willey Publications, ISBN: 978-1-119-54898-0, April 2019

Suggested List of Experiments: -

Suggested Case List: -