

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD354
Course Title:	Human Computer Interface
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. evaluate user interfaces to detect usability problems
2. apply an appropriate interaction style for a given need
3. implement the HCI techniques to build multimodal GUI
4. build the applications having sensory signal driven UI

Syllabus:

Total Teaching hours: 45

Unit	Syllabus	Teaching hours
Unit-I	Introduction: Introduction to the field of HCI, HCI's and human factors engineering and user experience design. Human perception: perception, gestalt perception, information presentation: typography, color, graphic design, displays, paper, and other output devices, layout: forms design and information visualization, virtual reality, context-sensitive interfaces	07
Unit-II	User Interface Design and Principles: principles of HCI, ubiquity of feedback cycles, the importance of direct manipulation, and the extent of human abilities as they relate to computer interfaces, understanding of user tasks and activities, HCI heuristics. Creating good user interfaces: need-finding, prototyping potential interfaces, and evaluating those interfaces with users, research ethics underlying the design life cycle, as well as applications of this life cycle to the modern era of rapid prototyping	08
Unit-III	Interactive Devices, User Interfaces and Interaction styles: input devices and ergonomics: multi-touch, augmented reality, haptics, wearables, brain computer interfaces, and tangibles. Multimodal user interfaces: basic technologies for handling speech, vision, pen-based interaction, and other modalities, as well as various techniques for combining modalities. Interaction styles: metaphor, direct manipulation, widget survey, other interaction styles, and choosing among interaction styles	18
Unit-IV	Applications: Exploration into the applications of HCI to open areas like augmented reality, education, social computing, mental health, healthcare, medical science and assistive applications for differently abled	12

RD

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

- Suggested Readings/References:
1. Ben Shneiderman, Catherine Plaisant, et al. Designing the User Interface, Addison Wesley
 2. Preece, Sharp & Rogers, Interaction Design: Beyond Human-Computer Interaction, John Wiley & Sons
 3. Dix A., Finlay J., Abowd G. D. and Beale R., Human Computer Interaction, Pearson Education.
 4. Cooper, Reimann, Cronin, & Noessel., About Face: The Essentials of Interaction Design, Wiley
 5. Preece J., Rogers Y., Sharp H., Baniyon D., Holland S. and Carey T., Human Computer Interaction, Addison-Wesley.
 6. B.Shneiderman, Designing the User Interface, Addison Wesley (Indian Reprint)
 7. Research Papers related to HCI applications and core research

Suggested List of Experiments:	Sr. No.	Title	Hours
	1	To design voice-controlled robot. Build the robot chatbot using cloud services such as: conversation service, Text to speech conversion, language translator and speech to text conversion services. Application can be built on IBM/Google/Any other cloud platform and the application needs to be deployed on Arduino/raspberry PI.	02
	2	To design voice-controlled application using Alexa skills and install the skill on Alexa device.	04
	3	To design application that senses vibrotactile feedback/tacton using haptics technology and behave accordingly.	02
	4	To design application that senses the tactile perception using any one type of mechanoreceptors: Merkel disks, Ruffini cylinders, Pacinian corpuscles, Meissener's corpuscles and based on the perception different functions are executed.	04
	5	To design application that detects bodily position, weight, or movement of the muscles, tendons, and joints using various sensors (kinesthetic haptics) and uses that information to build a customized application	04
	6	To study the working of Brain interface device (Emotiv EPOC+/any other EEG device) and learn to configure and calibrate it for experiment use.	02
	7	To record brain signals for users using Emotiv EPOC+ when they perform a specific task (Ex: reading a passage) and to do the analysis of the recording using Emotiv Pro / similar software.	04

- | | | |
|----|---|----|
| 8 | To study the working of Eye Tracker device and learn to configure and calibrate it for experiment use. | 02 |
| 9 | To analyze the eye responses for interpreting/predicting the perception of a user for the viewed/read content from the user screen/ visual field. | 04 |
| 10 | To use various wearable devices and/or sensory input devices to record various sensory signals and use the signals to build a novel application. | 02 |

Suggested Case List: -NA-