Devi Ahilya University, Indore, India Institute of Engineering & Technology				IV B.E. (Information Technology)		
Subject Code & Name	**Instructions Hours per Week**			**Credits**		
ITR8C2	**L**	**T**	**P**	**L**	**T**	**P**
Human Computer Interaction	**3**	**1**	**2**	**3**	**1**	**1**
Duration of Theory Paper: 3 Hours						

Learning Objectives:

- To understand the principles, techniques and methods in the field.
- To introducestudents to theoretical frameworks, models and major developments in HCI.
- To design and evaluate interactive technologies on various grounds to improve the interaction between humans and computers.

Pre-requisites: Fundamentals of programming using structured and object-oriented languages along with a basic understanding of creation of user interfaces using some GUI development tool.

COURSE CONTENTS

UNIT I

Introduction, History and Foundations of HCI, the challenges: People and Technology, human and Machine- Interaction, Command Line Interface, Graphical User Interface,Ergonomics, Cybernetics, Haptics, Usability of a computer based interactive system, areas of knowledge that relate with HCI, HCI in the context of mobile devices, consumer devices, business applications, scientific applications, web-based applications, collaboration systems, games, etc.
Social
issues influencing HCI

UNIT II

Basics of Interaction Design: Design, Design process, Navigation design, Screen design and layout. Design rationale. Rules for designing GUIs: Principles, Standards, Guidelines, Golden rules and heuristics, HCI patterns. Implementation details: Perception, gestalt perception, typography, Graphic design- color, display, paper, and other output devices,designing formsand information visualization, events, action object and object action. Overview of the elements of windowing systems, Programming the application, using toolkit and User interface management systems. Software process involved in HCI, Usability engineering, Iteration and prototyping, virtual reality.

UNIT III

Evaluation, Universal Design and User Support: Evaluation techniques: evaluation, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, choosing an evaluation method. Heuristic evaluation and cognitive walkthroughs. Universal design: principles, Multi-modal interaction, designing for diversity. User support: Requirements of user support, Approaches to user support, Adaptive help systems, designing user support systems.

UNIT IV

Models and Theories: Cognitive models: Goal and task hierarchies, Linguistic models, The challenge of display-based systems, Physical and device models, Cognitive architectures. Socio-organizational issues and stakeholder requirements: Organizational issues, Capturing requirements. Communication and collaboration models: Face-to-face communication, Conversation, Text-based communication, Group working. Task analysis: Differences between task analysis and other techniques, Task decomposition, Knowledge-based analysis, Entity– relationship-based techniques, Sources of information and data collection, Uses of task analysis. Dialog notations and design, Models of the system: Standard formalisms, Interaction models, Continuous behavior. Modeling rich interaction.

UNIT V

Groupware, Ubiquitous computing and WWW: Groupware: Groupware systems, Computer-mediated communication, Meeting and decision support systems, Shared applications and artifacts, Frameworks for groupware, implementing synchronous groupware. Ubiquitous computing and augmented realities: Ubiquitous computing applications research, Virtual and augmented reality, Information and data visualization. Hypertext, multimedia and the World Wide Web: Understanding hypertext, Finding things, Web technology and issues, Static web content, Dynamic web content. Case Studies.

Learning Outcomes:

1. Evaluate the usability of a computer- based system using the concepts studied with respect to HCI
2. Integration of HCI concerns in the software development process

BOOKS RECOMMENDED:

[1] Alan Dix, Janet E. Finlay, "Human-Computer interaction", Pearson Education.
[2] Olsen, "Human-Computer Interaction", Cengage Learning.
[3] Preece, J. Sharp, H. & Rogers, "Interaction design: beyond human-computer interaction", Y. Wiley.
[4] Smith AtakanSerengal, "Human-Computer Interaction", Cengage Learning.

List of Practical Assignment (Tentative):

1. Designing command line interface (CLI)-based programs using argc and argv in C/ C++.
2. Designing command line interface (CLI)-based programs using String args[] in Java.Hands on experience with the Java AWT to create simple GUIs
3. Designing a simple GUI and a few complex GUIs using Visual Basic or other tools of student's choice.
4. Evaluation of a few websites and documenting observations.
5. Evaluation of a few forms with respect to usability, verification and validation.
6. Building an interface using prototyping paradigm
7. Documentation of the tool the student has used for building GUIs.
8. Study and working with the haptic glove available with the university.
9. Study of HCI design from ergonomics point of view.

Program Outcomes (POs):

PO1: Engineering Principles and Problem-Solving in Human and computer interactions.
Demonstrate a solid understanding of engineering principles and apply them to solve complex problems in interactions and related fields.

PO2: Proficiency in Graphics Programming and Tools
Description: Exhibit proficiency in programming and the use of specialized software and tools.

PO3: Critical Thinking and Innovation in Graphical design elements
Description: Apply critical thinking and problem-solving skills to develop innovative graphical solutions.

PO4: User interface design management
Overview of the elements of windowing systems, Programming the application, using toolkit and User interface management systems.

PO5: Software process involved in HCI, Usability engineering, Iteration and prototyping,

PO6: Universal design, principles, Multi-modal interaction, designing for diversity.
Understand the design principles used in multi- model interactions used among the diffraction fields of computers.

PO7: Communication and collaboration models.
Deep understanding various type of communications and Knowledge-based analysis,

PO8: Groupware systems and Frameworks for groupware.
Fundamental of Groupware and implementation of frameworks for Computer-mediated communication, Meeting and decision support systems.

After Successful completion of the course, the students should be able to

CO1: Understanding the characteristics of graphical and user interface in designing a user interface for an application.
CO2: Learning the basics of user interface with considering the human characteristics, in relevance to design standards and guidelines.
CO3: Learning and design of various tools used for interaction with computers
CO4: Demonstrate the use of multimedia system components
CO5: Develop test cases and evaluate the working system of Frameworks.

Matrix for CO-PO Relationship

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	-	-	-	1	1	1
CO2	3	3	2	-	-	2	-	-
CO3	3	2	3	-	2	1	1	1
CO4	3	-	2	-	-	-	2	-
CO5	3	2	2	-	-	2	-	3

In this matrix:

- - indicates no contribution.
- 1 indicates a relevant and small significance.
- 2 indicates a medium or moderate contribution.
- 3 indicates a strong contribution.

This matrix clearly shows the contribution levels of each course outcome (CO) to the respective program outcomes (PO).