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| **School: SET** | | **Batch : 2019-2023** | | | | | |
| **Program:B.Tech** | | **Current Academic Year:** | | | | | |
| **Branch:IT** | | **Semester: IV** | | | | | |
| 1 | Course Code | CSA021 | Course Name | | | | |
| 2 | Course Title | Human Computer Interaction | | | | | |
| 3 | Credits | 3 | | | | | |
| 4 | Contact Hours  (L-T-P) | 3-0-0 | | | | | |
|  | Course Status | Specialization Elective | | | | | |
| 5 | Course Objective | 1. Understand fundamental design and evaluation methodologies of human computer interaction. 2. Demonstrate knowledge of human computer interaction design concepts and related methodologies. 3. Apply theories and concepts associated with effective work design to real-world application. | | | | | |
| 6 | Course Outcomes | CO1: Define the capabilities of both humans and computers from the viewpoint of human information processing.  CO2: Explain typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.  CO3: Apply HCI design principles, standards and guidelines.  CO4: Analyse and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.  CO5:Analyse the tasks of HCI systems.  CO6:Adopt a variety of simple methods for evaluating the quality of a user interface. | | | | | |
| 7 | Course Description | Students will learn the fundamental concepts of human-computer interaction and user centred design thinking, through working in teams on an interaction design project, supported by lectures, readings, and discussions. They will learn to evaluate and design usable and appropriate software based on psychological, social, and technical analysis. They will become familiar with the variety of design and evaluation methods used in interaction design. | | | | | |
| 8 | Outline syllabus | | | | | CO Mapping | |
|  | **Unit 1** | **Introduction** | | | |  | |
| A | Why Human–Computer Interaction?, What is Hci?, Who is Involved in Hci?,Models of Interaction Theory And Hci, Human Introduction, Input–Output Channels(Vision, Hearing, Touch, Movement), Human Memory(Sensory Memory,Long-Term Memory,), Psychology And The Design Of Interactive Systems, | | | | CO1 | |
| B | Input Devices For Interactive Use, Allowing Text Entry, Drawing And Selection From The Screen:–(Text Entry, Pointing, 3d Interaction Devices), Output Display Devices For Interactive Use, Virtual Reality Systems And 3d Visualization, Various Devices In The Physical World, Paper Output And Input, Memory(Short-Term Memory, Long-Term Memory, Access Methods), Processing(Effects, Limitations, Networks And Impact On System Performance) | | | | CO1 | |
| C | The Interaction:Introduction, Models Of Interaction (Execution–Evaluation Cycle, Interaction Framework), Frameworks And Hci, Ergonomics, Interaction Styles, Elements Of The Wimp Interface, Interactivity, Context Of The Interaction,Experience, Engagement And Fun | | | | | CO1 |
|  | **Unit 2** | **Design Process** | | | | |  |
| A | Interaction Design Basics: Introduction, The Process of Design, User Focus, Scenarios, Navigation Design (Local Structure, Global Structure), Screen Design And Layout (Tools For Layout, User Action And Control, Appropriate Appearance), Iteration And Prototyping | | | | | CO2 |
| B | HCI in The Software Process: Introduction, The Software Life Cycle (Activities, Validation and Verification, Management and Contractual Issues, Interactive Systems for Software Lifecycle), Usability Engineering, Iterative Design and Prototyping, Techniques For Prototyping, Design Rationale (Process-Oriented Design Rationale, Design Space Analysis, Psychological Design Rationale) | | | | | CO2 |
| C | Design Rules: Introduction, Principles to Support Usability (Learnability, Flexibility, Robustness), Standards, Guidelines, Golden Rules and Heuristics (Shneiderman’s Eight Golden Rules 0f Interface Design, Norman’s Seven Principles for Transforming Difficult Tasks into Simple Ones), HCI Patterns | | | | | CO2 |
|  | **Unit 3** | Implementation Support | | | | |  |
| A | Introduction of Implementation Support, Elements of Windowing Systems: Examples of Imaging Models, Architectures of Windowing Systems, Programming The Application, Using Toolkits, Usability Principles, User Interface Management Systems: UIMS As A Conceptual Architecture, Implementation Considerations) | | | | | CO3 |
| B | Evaluation Techniques, what is Evaluation? Goals of Evaluation, Evaluation Through Expert Analysis: Cognitive Walkthrough, Heuristic Evaluation, Model-Based Evaluation, Evaluation Through User Participation, Empirical Methods: Experimental Evaluation, Observational Techniques, Query Techniques, Evaluation Through Monitoring Physiological Responses, Choosing an Evaluation Method, A Classification Of Evaluation Techniques | | | | | CO3 |
| C | Universal Design: Introduction, Universal Design Principles, Multi-Modal Interaction, Sound in The Interface, Touch In The Interface, Handwriting Recognition, Gesture Recognition, Designing For Diversity: Designing For Users With Disabilities, Designing For Different Age Groups, Designing For Cultural Differences | | | | | CO3 |
|  | **Unit 4** | **Models and Theories** | | | | |  |
| A | Cognitive Models: Introduction, Goal And Task Hierarchies(GOMS, Cognitive Complexity Theory, Problems And Extensions Of Goal Hierarchies), Linguistic Models(BNF, Task–Action Grammar), Challenge Of Display-Based Systems, Physical And Device Models(Keystroke-Level Model, Three-State Model), Cognitive Architectures(The Problem Space Model, Interacting Cognitive Subsystems) | | | | | CO4 |
| B | Socio-Organizational Issues And Stakeholder Requirements: Introduction, Organizational Issues: Cooperation or Conflict? Invisible Worker, Automating Processes – Workflow and BPR, Capturing Requirements (Stakeholders, Socio-Technical Models, Soft Systems Methodology, Participatory Design, Ethnographic Methods) | | | | | CO4 |
| C | Communication And Collaboration Models: Introduction, Face-To-Face Communication(Transfer Effects and Personal Space, Eye Contact and Gaze, Gestures and Body Language, Back Channels, Confirmation and Interruption, Turn-Taking), Conversation, Speech Act Theory, Text-Based Communication(Back Channels and Affective State, Grounding Constraints, Turn-Taking, Context And Deixis, Pace And Granularity, Linear Text Vs. Hypertext), Group Working. | | | | | CO4 |
|  | **Unit 5** | **Task Analysis** | | | | |  |
| A | Introduction of Task, Differences Between Task Analysis and Other Techniques, Task Decomposition, Knowledge-Based Analysis, Entity–Relationship-Based Techniques, Sources of Information and Data Collection (Documentation, Observation, Interviews, Initial Analysis, Sorting and Classification), Uses Of Task Analysis | | | | | CO5 |
| B | Dialog Notations and Design Introduction, Dialog: Structured Human Dialogs, Dialog Design Notations, Diagrammatic Notations (State Transition Networks, Hierarchical State Transition Nets, Concurrent Dialogs and Combinatorial Explosion of States, Escapes, Petri Nets, State Charts, Flow Charts, JSD Diagrams), Textual Dialog Notations, Dialog Semantics, Dialog Analysis and Design | | | | | CO5, CO6 |
| C | Standard Formalisms, Formal Notations, Model-Oriented Notations and Issues, Algebraic Notations, Temporal Logics, Interaction Models (Pie Model, Predictability, Observability, Reachability), Continuous Behavior, Modeling Rich Interaction, Status–Event Analysis, Rich Contexts (Collaboration, Information, Triggers, Artifacts, Placeholders), Low Intention and Sensor-Based Interaction | | | | | CO5, CO6 |
|  | Mode of examination | Theory | | | |  | |
|  | Weightage Distribution | CA | | MTE | ETE |  | |
| 30% | | 20% | 50% |  | |
|  | Text book/s\* | 1. Alan dix, janet finlay, gregory d. Abowd, russell beale, "human–computer interaction" third edition, pearson education limited | | | |  | |
|  | Other References | 1. Rajiendra Kumar, " Human Computer Interaction" Second Edition, Firewall Media New Delhi. 2. Ben Shneiderman, "Design the User Interface: Strategies for Effective Human-Computer Interaction" Pearson Education. | | | |  | |

**CO and PO Mapping**

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| S. No. | Course Outcome | Program Outcomes (PO) & Program Specific Outcomes (PSO) |
| 1. | CO1: Define the capabilities of both humans and computers from the viewpoint of human information processing. | PO1,PO2,PO3,PO4,  PO5,PO6,PO7,PO8,  PO9,PO10, PSO1,PSO2,PSO3 |
| 2. | CO2: Explain typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms. | PO1,PO2,PO3,PO4,  PO5,PO6,PO7,PO8,  PO9,PO10, PSO1,PSO2,PSO3 |
| 3. | CO3: Apply HCI design principles, standards and guidelines. | PO1,PO2,PO3,PO4,  PO5,PO6,PO7,PO8,  PO9,PO10, PSO1,PSO2,PSO3 |
| 4. | CO4: Analyse and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems. | PO1,PO2,PO3,PO4,  PO5,PO6,PO7,PO8,  PO9,PO10, PSO1,PSO2,PSO3 |
| 5 | CO5:Analyse the tasks of HCI systems. | PO1,PO2,PO3,PO4,  PO5,PO6,PO7,PO8,  PO9,PO10, PSO1,PSO2,PSO3 |
| 6 | CO6:Adopt a variety of simple methods for evaluating the quality of a user interface. | PO1,PO2,PO3,PO4,  PO5,PO6,PO7,PO8,  PO9,PO10, PSO1,PSO2,PSO3 |

**PO and PSO mapping with level of strength for Course Name** Human Computer Interaction **(Course Code** CSA-021**)**

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| **Subject** | **PO’s / PSO’s** | **PO**  **1** | **PO**  **2** | **PO**  **3** | **PO**  **4** | **PO**  **5** | **PO**  **6** | **PO**  **7** | **PO**  **8** | **PO**  **9** | **PO**  **10** | **PO**  **11** | **PO**  **12** | **PSO**  **1** | **PSO**  **2** | **PSO**  **3** |
| Human Computer Interaction **(Course Code** CSA-021**)** | CO1 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 2 | 2 | 1 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 2 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 3 | 2 |
| CO4 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 3 | 2 |
| CO5 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 3 | 2 |
| CO6 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 3 | 3 |

**Average of non-zeros entry in following table (should be auto calculated).**

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| **Course Code** | **Course Name** | **PO 1** | **PO2** | **PO 3** | **PO 4** | **PO 5** | **PO 6** | **PO 7** | **PO 8** | **PO 9** | **PO 10** | **PO 11** | **PO 12** | **PSO 1** | **PSO 2** | **PSO 3** |
| CSA-021 | Human Computer Interaction | 3.00 | 3.00 | 2.83 | 2.83 | 1.83 | 1.33 | 1.00 | 1.00 | 1.00 | 2.00 | 0.00 | 3.00 | 2.67 | 2.83 | 2.00 |

**Total- 30.33**

**Strength of Correlation**

**1.** Addressed to **Slight (Low=1) extent 2.** Addressed to **Moderate (Medium=2) extent**

**3.** Addressed to **Substantial (High=3) extent**