Course Code: CSDT114B	Course Name: Artificial Intelligence	Total Lectures (30 Hours)
Teaching Scheme : 4 hrs/week	Examination Scheme: IA: 15 Marks UE: 35 Marks	No. of Credits 02
Course Prerequisites:	☐ Concepts of Data structures and Design and Analysis of algorithms. ☐ Strong data analytics skills. ☐ Strong will to learn machine learning languages.	
Course Objectives:	☐ To learn various types of algorithms useful in Artificial Intelligence (AI). ☐ To convey the ideas in AI research and programming language related to emerging technology. ☐ To understand the numerous applications and huge possibilities in the field of AI that goes beyond the normal human imagination.	
Chapter	**Course Contents**	**No. of Lectures**
1	**Introduction to Artificial Intelligence:** Introduction and Intelligent systems, What Is AI, The Foundations of Artificial Intelligence, The History of Artificial Intelligence, Applications of AI, Early work in AI and related fields, AI problems and Techniques.	2
2	**Searching:** -Defining AI problems as a State Space Search: example, Search and Control Strategies, Problem Characteristics, Issues in Design of Search Programs, Production System. Blind Search Techniques : -BFS, DFS, DLS, Iterative Deepening, Search, Bidirectional Search, Uniform cost Search. Heuristic search techniques: -Generate and test ,Hill Climbing, Best First search, Constraint Satisfaction, Mean-End Analysis, A*,AO*.	8

3	**Knowledge Representation:** Representations and Mappings, Approaches to Knowledge Representation, Knowledge representation method, Propositional Logic, Predicate logic, Representing Simple facts in Logic, Resolution, Forward and backward chaining . Game Playing- Minimax Search Procedures, Adding alpha-beta cutoffs.	8
4	**Introduction to AI with Python:** Introduction to Python , why python with AI, Features of Python, Basics of Python, Python statements, Methods & Functions using python, Basic and advanced modules &Packages, Python Decorators and generators .Advanced Objects & Data structures.	6
5	**Machine Learning:** Why Machine learning, Types of Machine Learning: Supervised learning- Classification & Regression. Random Forest, KNN Algorithm. Unsupervised learning-Clustering & Association. Reinforcement learning.	6

References:

Sr. No.	Title of the Book	Author/s	Publication
1	Computational Intelligence	Eberhart	Elsevier Publication
2	Artificial Intelligence: A New Synthesis	Nilsson	Elsevier Publication
3	Artificial Intelligence with Python	PrateekJoshi	Packt Publishing Ltd
4	Reinforcement and Systematic Machine Learning for Decision Making,	Parag Kulkarni	Wiley-IEEE Press Edition
5	Artificial Intelligence	Saroj Kausik	Cengage Learning
6	Introduction to Machine Learning	EthemAlpaydin	PHI 2nd Edition

CSDP114B: Artificial Intelligence Practical

Sr. No.	Assignment
1	Subject teacher should conduct first lab practical on basic programs using python for introducing and using python environment such as, a) Program to print multiplication table for given no. b) Program to check whether the given no is prime or not. c) Program to find factorial of the given no and similar programs.
2	Write a program to implement List Operations(Nested list, Length, Concatenation, Membership ,Iteration ,Indexing and Slicing), List Methods(Add, Append, Extend & Delete)
3	Write a program to Illustrate Different Set Operations.
4	Write a program to implement Simple Chatbot.
5	Write a program to implement Breadth First Search Traversal.
6	Write a program to implement Depth First Search Traversal.
7	Write a program to implement Water Jug Problem.
8	Write aprogram to implement K -Nearest Neighbor algorithm.
9	Write a program to implement Regression algorithm.
10	Write a program to implement Random Forest Algorithm.

Course Code: CSDT124B	Course Name: Human Computer Interaction	Total Lectures (30 Hours)
Teaching Scheme : 4 hrs/week	Examination Scheme: IA: 15 Marks UE: 35 Marks	No. of Credits 2
Course Prerequisites:	• Foundations of Human Computer Interaction • Be familiar with the design technologies for individuals and persons with disabilities • Be aware of mobile HCI • Learn the guidelines for user interface.	
Course Objectives:	• Design effective dialog for HCI. • Design effective HCI for individuals and persons with disabilities. • Assess the importance of user feedback. • Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites. • Develop meaningful user interface.	
Chapter	Course Contents	No. of Lectures
1	**FOUNDATIONS OF HCI** The Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.	6
2	**DESIGN & SOFTWARE PROCESS** Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design	7
3	**MODELS AND THEORIES** Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-Hypertext, Multimedia and WWW.	5
4	**MOBILE HCI** Mobile Ecosystem: Platforms, Application frameworks Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.	6

| 5 | **WEB INTERFACE DESIGN**
Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow, Case Studies. | 6 |

References:

Sr. No.	Title of the Book	Author/s	Publication
1	Human Computer Interaction, (Chapter 1 , 2 & 3)	Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale	3rd Edition, Pearson Education, 2004
2	Mobile Design and Development (Chapter 4)	Brian Fling	First Edition O"Reilly Media Inc., 2009
3	Designing Web Interfaces (Chapter 5)	Bill Scott and Theresa Neil	First Edition, O"Reilly, 2009

CSDP124B: Human Computer Interaction Practical Assignments

Note: Any tool or technology can be used for implementation e.g., VBDOTNET, JAVA, PHP, etc.

1) Understand the trouble of interacting with Computers - Redesign interfaces of applications. Select any application, like land-line phone application, registration etc and understand the trouble of interacting with that application. Comment on design of that application as good or bad design based on whether interaction principles are matching with users mental model or not. Redesign the interface for mention the change in design and reason.

2) Know your client: Select anyone category of user and develop application understanding the user who will be using your system. Comment on the category of user selected and specific features given for the users and identify what kinds of interfaces will they like and why?. Compare with existing system analyze and rate them.Analyze user models and develop user centric interfaces for :

   a. Children (4-5 years of age): An application to teach math.
      Perform analysis of children behavior e.g. their preferences, interests etc

   b. Teenagers: Design a digital diary for young teens to help them overcome various social pressures they deal with during their teen years. The diary should also be like a self help tool which would help them deal with incidents like bullying, peer pressure, etc.. This is an open project and you can think in any direction to make the children sail through their teen years while trying to discover life around them.
      Perform analysis of teenagers e.g. their problems, interests, needs, etc

   c. Older generation: Folks from the older generation has been very wary of using their credit card on the Internet. They have various concerns when it comes to paying their bills. Also because of their old age, it will be beneficial for them to use the internet and pay their phone, electricity, gas, etc. bills
      Analysis of old people e.g. their nature, interests, needs, etc

   d. Rural people: ATVM for train ticketing in rural area
      Perform analysis of rural people e.g. their problems, interests, needs, language etc

   e. Mentally disabled: Design the interface of a game for mentally disabled children. □
      Analysis of mentally disabled e.g. their behavior, problems, interests…

   Any tool or technology can be used for implementation e.g., VB, DOTNET, JAVA, PHP, etc.

3) Identify 5 different websites catering to one specific goal (eg. Goal – on-line shopping and 5 different websites – ebay, amazon, flipkart, zovi, myntra) and perform a competitive analysis on them to understand how each one caters to the goal, the interactions and flow of the payment system and prepare a report on the same. Consider any 8 HCI principles and prepare the following table evaluating the websites.

Sr. No	Principles	Poor	Average	Good	Good Very	Excellent
1.	Aesthetically pleasing					
2.	..					

4) To achieve simplicity one needs to optimize the number of elements on a screen, within limits of clarity. And minimize the alignment points, especially horizontal or columnar
   1. Calculate Screen Complexity for existing Graphical User Interface (GUI).
   2. Redesign the Screen by applying various guidelines to lower the complexity of selected Graphical User Interface (GUI) to achieve simplicity

   Method for Measuring Complexity:
   1. Draw a rectangle around each element on a screen, including captions, controls, headings, data, title, and so on.
   2. Count the number of elements and horizontal alignment points (the number of columns in which a field, inscribed by a rectangle, starts).
   3. Count the number of elements and vertical alignment points (the number of rows in which an element, inscribed by a rectangle, starts).
   4. Calculate number of bits required by horizontal (column) alignment points and number of bits required by vertical (row) alignment points by applying following formula for calculating the measure of complexity.

   $$C = -N \sum_{n=1}^{m} p_n \log_2 p_n$$

   C, complexity of the system in bits
   N, total number of events (widths or heights)
   m, number of event classes (number of unique widths or heights)
   pn, probability of occurrence of the nth event class (based on the frequency of events within that class)
   5. Calculate overall complexity by adding the number bits required by horizontal alignment points and vertical alignment points.

5) Design/Redesign web user interface based on Gestalt theories and comment on the principle applied and justify. Alsoanalyze one image in which Gestalt principle is applied and comment.
   Example: Take a look at old IBM logo:

   You recognize the letters as an I, a B, and an M, no problem there. But they aren't letters at all; the whole thing is a compilation of bright blue horizontal lines arranged to create the perception of a set of letters. Gestalt Property used here is Closure. Closure means that we "close" objects that are themselves not complete; not only completing the figure in our

perception, but perceiving the figure as having an extra element of aesthetic design; we look for a simple, recognizable pattern.

6) Design an application which consists of different types of menus such as Menu bar, Pull-Down Menu, Cascading Menu, Pop-up Menus,Tear-off Menus. Apply and explain general menu design guidelines applied for formatting, ordering, phrasing, selecting choices, and navigating menus for application which is designed.

7) Implement different Kinds of Windows such as message boxes, palette Windows, Pop-up Windows, primary window, secondary window, dialog boxes, message box etc. For every window designed for the application explain:
   - Purpose
   - Description
   - Components
   - Kind window

8) Identify separate lines of business, e.g., medical, greeting cards, law etc. Design an application using proper guidelines for icons. Comment on design of icons and their relevance in the system.

   Icon design is an important process. Meaningful and recognizable icons will speed learning and recall and yield a much more effective system. Poor design will lead to errors, delays, and confusion. Looks different from all other icons.
      - Is obvious what it does or represents. - Is recognizable when no larger than 16 pixels square.
        - Looks as good in black and white as in color. Icon Size
   Supply in all standard sizes.
   - 16×16 pixels.
   - 16- and 256-color versions. - 32×32 pixels
   - 16- and 256-color versions. - 48×48 pixels
     - 16- and 256-color versions.
      - Use colors from the system palette.
      - Use an odd number of pixels along each side.
   - Provides center pixel around which to focus design.
   - Minimum sizes for easy selection:
   -With stylus or pen: 15 pixels square.
   - With mouse: 20 pixels square.
   - With finger: 40 pixels square. - Provide as large a hot zone as possible. Choosing Images
   - Use existing icons when available.
   - Use images for nouns, not verbs.
    - Use traditional images.
   - Consider user cultural and social norms.

   The Design Process of Icons
   -   Define purpose:
   To begin the design process, first define the icon's purpose and use. Have the design team brainstorm about possible ideas, considering real-world metaphors.
      - Collect, evaluate, and sketch ideas:

Start by designing on paper, not on the computer. Ask everyone to sketch his or her ideas.

- Draw in black and white: Many icons will be displayed in monochrome. Color is an enhancing property; consider it as such.
- Test for expectation, recognition, and learning. Choosing the objects and actions, and the icons to represent them, is not a precise process, and will not be easy. So, as in any screen design activity, adequate testing and possible refinement of developed images must be built into the design process. Icon recognition and learning should both be measured as part of the normal testing process.
- Test for legibility.

Verify the legibility and clarity of the icons in general. Also, verify the legibility of the icons on the screen backgrounds chosen. White or gray backgrounds may create difficulties. An icon mapped in color, then displayed on a monochrome screen, may not present itself satisfactorily. Be prepared to redraw it in black and white, if necessary.

- Register new icons in the system's registry.

Create and maintain a registry of all system icons. Provide a detailed and distinctive description of all new icons.