

# COMPUTER SCIENCE AND ENGINEERING/CS

## B.TECH. (CSE/CS)

### SEVENTH SEMESTER (DETAILED SYLLABUS)

Artificial Intelligence (KCS071)		
Course Outcome ( CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to understand		
CO 1	Understand the basics of the theory and practice of Artificial Intelligence as a discipline and about intelligent agents.	K <sub>2</sub>
CO 2	Understand search techniques and gaming theory.	K <sub>2</sub> , K <sub>3</sub>
CO 3	The student will learn to apply knowledge representation techniques and problem solving strategies to common AI applications.	K <sub>3</sub> , K <sub>4</sub>
CO 4	Student should be aware of techniques used for classification and clustering.	K <sub>2</sub> , K <sub>3</sub>
CO 5	Student should aware of basics of pattern recognition and steps required for it.	K <sub>2</sub> , K <sub>4</sub>
DETAILED SYLLABUS		3-0-0
Unit	Topic	Proposed Lecture
I	<b>INTRODUCTION :</b> Introduction–Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents– Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.	08
II	<b>PROBLEM SOLVING METHODS:</b> Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems – Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games	08
III	<b>KNOWLEDGE REPRESENTATION:</b> First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering-Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories – Reasoning with Default Information	08
IV	<b>SOFTWARE AGENTS:</b> Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems.	08
V	<b>APPLICATIONS:</b> AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving	08
<b>Text books:</b> <ol style="list-style-type: none"> <li>1. S. Russell and P. Norvig, “Artificial Intelligence: A Modern Approach”, Prentice Hall, Third Edition, 2009.</li> <li>2. I. Bratko, “Prolog: Programming for Artificial Intelligence”, Fourth edition, Addison-Wesley Educational Publishers Inc., 2011.</li> <li>3. M. Tim Jones, —Artificial Intelligence: A Systems Approach(Computer Science)ll, Jones and Bartlett Publishers, Inc.First Edition, 2008</li> <li>4. Nils J. Nilsson, —The Quest for Artificial Intelligencell, Cambridge University Press, 2009.</li> <li>5. William F. Clocksin and Christopher S. Mellish,  Programming in Prolog: Using the ISO Standardll, Fifth Edition, Springer, 2003.</li> <li>6. Gerhard Weiss, —Multi Agent Systemsll, Second Edition, MIT Press, 2013.</li> <li>7. David L. Poole and Alan K. Mackworth, —Artificial Intelligence: Foundations of Computational Agentsll, Cambridge University Press, 2010.</li> </ol>		

<b>KOE081: CLOUD COMPUTING</b>		
<b>DETAILED SYLLABUS</b>		<b>3-1-0</b>
<b>Unit</b>	<b>Topic</b>	<b>Proposed Lecture</b>
<b>I</b>	<b>Introduction:</b> Cloud Computing – Definition of Cloud – Evolution of Cloud Computing – Underlying Principles of Parallel and Distributed, History of Cloud Computing - Cloud Architecture - Types of Clouds - Business models around Clouds – Major Players in Cloud Computing-issues in Clouds - Eucalyptus - Nimbus - Open Nebula, CloudSim.	08
<b>II</b>	<b>Cloud Services:</b> Types of Cloud services: Software as a Service-Platform as a Service –Infrastructure as a Service - Database as a Service - Monitoring as a Service –Communication as services. Service providers- Google, Amazon, Microsoft Azure, IBM, Sales force.	08
<b>III</b>	<b>Collaborating Using Cloud Services:</b> Email Communication over the Cloud - CRM Management – Project Management-Event Management - Task Management – Calendar - Schedules - Word Processing – Presentation – Spreadsheet - Databases – Desktop - Social Networks and Groupware.	08
<b>IV</b>	<b>Virtualization for Cloud:</b> Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System VM, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - supervisors – Xen, KVM, VMware, Virtual Box, Hyper-V.	08
<b>V</b>	<b>Security, Standards and Applications:</b> Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud. Hadoop – MapReduce – Virtual Box — Google App Engine – Programming Environment for Google App Engine	08

#### Text Books:

1. David E.Y. Sarna, “Implementing and Developing Cloud Application”, CRC press 2011.
2. Lee Badger, Tim Grance, Robert Patt-Corner, Jeff Voas, NIST, Draft cloud computing synopsis and recommendation, May 2011.
3. Anthony T Velte, Toby J Velte, Robert Elsenpeter, “Cloud Computing: A Practical Approach”, McGrawHill 2010.
4. Haley Beard, “Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, Emereo Pty Limited, July 2008.

**B.TECH. (COMPUTER SCIENCE AND ENGINEERING)****VII & VIII SEMESTER (DETAILED SYLLABUS)**

<b>DISTRIBUTED SYSTEM</b>		
<b>DETAILED SYLLABUS</b>		<b>3-1-0</b>
<b>Unit</b>	<b>Topic</b>	<b>Proposed Lecture</b>
<b>I</b>	<b>Characterization of Distributed Systems:</b> Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. Architectural models, Fundamental Models. Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks ,Lamport's & vectors logical clocks. Concepts in Message Passing Systems: causal order, total order, total causal order, Techniques for Message Ordering, Causal ordering of messages, global state, termination detection.	<b>08</b>
<b>II</b>	<b>Distributed Mutual Exclusion:</b> Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms. Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.	<b>08</b>
<b>III</b>	<b>Agreement Protocols:</b> Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system. Distributed Resource Management: Issues in distributed File Systems, Mechanism for building distributed file systems, Design issues in Distributed Shared Memory, Algorithm for Implementation of Distributed Shared Memory.	<b>08</b>
<b>IV</b>	Failure Recovery in Distributed Systems: Concepts in Backward and Forward recovery, Recovery in Concurrent systems, Obtaining consistent Checkpoints, Recovery in Distributed Database Systems. Fault Tolerance: Issues in Fault Tolerance, Commit Protocols, Voting protocols, Dynamic voting protocols	<b>08</b>
<b>V</b>	<b>Transactions and Concurrency Control:</b> Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.	<b>08</b>

**Text books:**

1. Singhal&Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Ramakrishna,Gehrke," Database Management Systems", McGraw Hill
3. Vijay K.Garg Elements of Distributed Computing , Wiley
4. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Education
5. Tanenbaum, Steen," Distributed Systems", PHI

Human Computer Interface (KCS- 058)		
Course Outcome ( CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to		
CO 1	Understand and analyze the common methods in the user-centered design process and the appropriateness of individual methods for a given problem.	K <sub>2</sub> , K <sub>4</sub>
CO 2	Apply , adapt and extend classic design standards, guidelines, and patterns.	K <sub>3</sub> , K <sub>5</sub>
CO 3	Employ selected design methods and evaluation methods at a basic level of competence.	K <sub>4</sub> , K <sub>5</sub>
CO 4	Build prototypes at varying levels of fidelity, from paper prototypes to functional, interactive prototypes.	K <sub>4</sub> , K <sub>5</sub>
CO 5	Demonstrate sufficient theory of human computer interaction, experimental methodology and inferential statistics to engage with the contemporary research literature in interface technology and design.	K <sub>3</sub> , K <sub>4</sub>
DETAILED SYLLABUS		3-0-0
Unit	Topic	Proposed Lecture
I	<b>Introduction:</b> Importance of user Interface – definition, importance of 8 good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface	08
II	<b>Design process:</b> Human interaction with computers, importance of 8 human characteristics human consideration, Human interaction speeds, understanding business junctions. III Screen Designing : Design goals – Scre	08
III	<b>Screen Designing :</b> Design goals – Screen planning and purpose, 8 organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.	08
IV	<b>Windows :</b> New and Navigation schemes selection of window, 8 selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors	08
V	<b>Software tools :</b> Specification methods, interface – Building Tools. 8 Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.	08
<b>Text books:</b> 1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale Human Computer Interaction, 3rd Edition Prentice Hall, 2004. 2. Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, Research Methods in HumanComputer Interaction, Wiley, 2010. 3. Ben Shneiderman and Catherine Plaisant Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition, pp. 672, ISBN 0- 321-53735-1, March 2009), Reading, MA: Addison-Wesley Publishing Co.		

## **ROE- 074 Understanding the Human Being Comprehensively–Human Aspirations and its Fulfillment**

**COURSE OBJECTIVE:** *Students undergoing this course are expected to-*

1. To help the students having the clarity about human aspirations, goal, activities and purpose of life.
2. To facilitate the competence to understand the harmony in nature/existence and participation of human being in the nature/existence.
3. To help the students to develop the understanding of human tradition and its various components.

### **COURSE METHODOLOGY:**

1. The methodology of this course is explorational and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.
2. It is free from any dogma or set of do's and don'ts related to values.
3. It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated and encouraged to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation.
4. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student leading to continuous self-evolution.
5. This self-exploration also enables them to critically evaluate their pre- conditionings and present beliefs.

<b>ROE- 074 Understanding the Human Being Comprehensively–Human Aspirations and its Fulfillment</b>		
<b>Unit</b>	<b>Topic</b>	<b>Lectures</b>
<b>1</b>	<b>Introduction:</b> The basic human aspirations and their fulfillment through Right understanding and Resolution; All-encompassing Resolution for a Human Being, its details and solution of problems in the light of Resolution.	8
<b>2</b>	<b>Understanding Human being and its expansion:</b> The domain of right understanding starts from understanding the human being (the knower, the experiencer and the doer); and extends up to understanding nature/existence – its interconnectedness and co-existence; and finally understanding the role of human being in existence (human conduct).	8
<b>3</b>	<b>Activities of the Self:</b> Understanding the human being comprehensively is the first step and the core theme of this course; human being as co-existence of the self and the body; the activities and potentialities of the self; Reasons for harmony/contradiction in the self.	8

4	<b>Understanding Co-existence with other orders:</b> The need and the process of inner evolution (through self-exploration, self-awareness and self-evaluation)- particularly awakening to activities of the Self: Realization, Understanding and Contemplation in the Self (Realization of Co-Existence, Understanding of Harmony in Nature and Contemplation of Participation of Human in this harmony/ order leading to comprehensive knowledge about the existence)	8
5	<b>Expansion of harmony from self to entire existence:</b> Understanding different aspects of All-encompassing Resolution (understanding, wisdom, science etc.), Holistic way of living for Human Being with All-encompassing Resolution covering all four dimensions of human endeavour viz., realization, thought, behaviour and work (participation in the larger order) leading to harmony at all levels from self to Nature and entire Existence..	8

Reference Books:

1. A Foundation Course in Human Values and Profession Ethics (Text Book and Teachers' Manual), R. R. Gaur, R. Sangal, G. P. Bagaria (2010), Excel Books, New Delhi [ISBN 978-8-174-46781-2]
2. Avartansheel Arthshastra, A. Nagraj, Divya Path Sansthan, Amarkantak, India
3. Economy of Permanence – (a quest for social order based on non-violence), J.C.Kumarappa (2010), Sarva-Seva-Sangh-Prakashan, Varansi, India
4. Energy and Equity, Ivan Illich (1974), The Trinity Press, Worcester & Harper Collins, USA
5. IshandiNauUpnishad, Shankaracharya, Geeta press, Gorakhpur,
6. Manav Vyavahar Darshan, A. Nagraj, Divya Path Sansthan, Amarkantak, India
7. Manaviya Sanvidhan, A. Nagraj, Divya Path Sansthan, Amarkantak, India
8. MahasatipatthanSutta , S N Goenka, Vipassana Research Institute, First Edition, 1996
9. Small Is Beautiful: A Study of Economics as if People Mattered, E. F. Schumacher, 1973, Blond & Briggs, UK
10. Slow is Beautiful, Cecile Andrews <http://www.newsociety.com/Books/S/Slow-is-Beautiful>
11. Science & Humanism – towards a unified worldview, P. L. Dhar & R. R. Gaur (1990), Commonwealth Publishers, New Delhi
12. Sanchian Sri Guru Granth Sahib Ji ,Shiromani Gurdwara Parbhandhak Committee, 2001
13. SamanSuttam, JinendraVarni ,1974.
14. Vyavaharvadi Samajshastra, A. Nagraj, Divya Path Sansthan, Amarkantak, India
15. Vyavahatmak Janvad, A. Nagraj, Divya Path Sansthan, Amarkantak, India.