Amended Course as passed by the Subject Committee Meeting held on Feb. 29, 2004.

CMP 473.3 Artificial Intelligence

	Theory	Practical	Total
Sessional	30	20	50
Final	50	-	50
Total	80	20	100

Course Objectives:
The main objectives of this course are:
1.   To provide basic knowledge of Artificial Intelligence.
2.   To familiarize students with different search techniques.
3.   To acquaint students with the fields related to AI and the applications of AI

Course Contents:
1.   Introduction AI   (4 hrs)
         What is AI, importance of AI. AI and related fields. Brief history of AI.
         Applications of Artificial Intelligence. Definition and importance of Knowledge,
         and Learning.

2.   Problem solving   (6 hrs)
         Defining problems as a state space search, Problem formulation, Problem types,
         well – defined problems, Constraint satisfaction problem, Game playing,
         Production systems.

3.   Search techniques   (9 hrs)
         Uninformed search techniques – depth first search. Breadth first search, depth
         limit search, and search strategy comparison Informed search techniques – hill
         climbing, best first search, greedy search, A * search Adversarial search
         techniques-minima procedure.

4.   Knowledge representation, inference and reasoning   (12 hrs)
         Formal logic- connectives, truth tables, syntax, semantics, tautology, validity,
         well- formed – formula, prepositional logic, Predicate logic, FOPL, interpretation,
         quantification horn clauses, rules of inference, unification, resolution refutation
         system (RRS), answer extraction from RRS, rule based deduction system,
         Statistical Reasoning – Probability and Bayes' theorem and causal networks,
         reasoning in belief network

5.   Structured knowledge representation   (4 hrs)
         Representations and Mappings, Approaches to knowledge Representation. Issues
         in Knowledge Representation, Semantic nets, frames, conceptual dependencies
         and scripts.

6.   Machine Learning   (4 hrs)
Concepts of learning, learning form examples, explanation based learing, learning by analogy, leaning by simulating evolution, learning by training neural nets. Learning by training perceptions.

7.   Applications of AI   (6 hrs)
Expert Systems. Neural Network, Natural Language Processing, Machine Vision

Laboratory Works:
Laboratory exercises should be conducted in either LISP or PROLOG.
Laboratory exercises must cover the fundamental search techniques. Simple question answering, inference and reasoning.

References:
1.   E. Rich and Knight. *Artificial Intelligence*, Mc Graw Hill 1991.
2.   D. W. Patterson, *Artificial Intelligence and Expert Systems*. Prentice Hall. 2001.
3.   P.H. Winston. *Artificial Intelligence*. Addison Wesley, 1984.
4.   Stuart Russel and Peter Norvig, *Artificial Intelligence A Modern Approach.* Pearson.
5.   Lvan Bratko, *PROLOG Programming for Artificial Intelligence*, Addison Wesley, 2001.
6.   Leon Sterling, Ehud Shapiro, *The Art of PROLOG: Advanced Programming Techniques,* prentice Hall. 1996.