Brooklyn College
Department of Computer & Information Sciences

CISC 7414 [*718X] Expert Systems

37½ hours plus conference and independent work; 3 credits

Study of systems that apply expertise in specific domains to make analyses and recommendations. The theory, design, and application of such systems will be discussed. Topics include: rule-based systems, inference engines, dealing with uncertainties, user interactions and knowledge engineering, knowledge acquisition, knowledge representation, induction and learning systems, limits of expert systems. Some current expert systems will be discussed. Students will build a simple expert system as a term project.

Objectives:
To give computer science Master's Degree Candidates a thorough foundation in the discipline of Artificial Intelligence, focussing on Expert Systems, and related methodologies; to bring current trends and advances in the discipline to the forefront so that they may be considered for possible use as solutions to appropriate problems.

Textbook:

Expert Systems: Principles and Programming, (4^{th} ed.) Joseph C. Giarratano, Gary D. Riley.

Syllabus:

1. A general introduction to the domain of artificial intelligence .

2. Developing knowledge-bases, inference techniques: forward chaining, backward chaining, Bayesian approaches for inexact reasoning, certainty theory and fuzzy logic.

3. Important and famous systems; the state of the art.

4. Expert Systems and Problem Solving.

5. Knowledge engineering, acquisition of concepts from sample data, the knowledge approach, knowledge synthesis, using deep knowledge.

6. Neural networks, genetic algorithms, and agent-based methods.

Bibliography:

1. Conceptual Structures: Information Processing in Mind and Machine , By J. F. Sowa, (1984) Addison – Wesley.

2. Bayesian Artificial Intelligence, By Kevin B. Korb and Ann E. Nicholson, Chapman and Hall, CRC Press (2004).

3. Foundations of Neural Networks, Fuzzy Systems, and Knowledge Engineering, Kasabov, Nikola K. , 1996, Cambridge, MA. Bradford Books, MIT Press.

4. Introduction to Expert Systems, 3rd ed. (1998) By Peter Jackson, Addison-Wesley.

5. PROLOG Programming for Artificial Intelligence 3rd. ed. (1990), By Ivan Bratko.

6. Understanding Neural Networks, Caudill, M. and Butler, C. vol 1: Basic Networks, (Macintosh or PC version) London, 1992, Bradford Books, MIT Press.