

**CSE 352 Artificial Intelligence FALL 2009 Professor
Anita Wasilewska**

<http://www.cs.sunysb.edu/~cse352>

Meets Tuesday, Thursday 3:50 - 5:10pm pm

Place Physics 117

Professor Anita Wasilewska e-mail: anita@cs.sunysb.edu, Office phone number: 632 8458 Office location: Computer Science Department building, office 1428.

Office Hours Tue, Th 2:30- 3:30 pm, and by appointment

Textbook

The Essence of ARTIFICIAL INTELLIGENCE, Alison Cawsey, Prentice HALL, 1998.

This is a short condensed book (not expensive!). Everybody has to buy the book!

We will cover in detail first 3 chapters (plus my lecture notes) and chapter 7. But it is your responsibility to read all of the book and refer to its proper chapters in your presentations.

Lecture Notes are on the course WEB PAGE.

Grading During the semester there will be:

a take- home Final (75pts) examinations covering material covered in class and taken from reading assignments;

a project (see project description) and project presentation (50pts);

a research presentation given in class. It is a power point formal presentation (75pts);

4 homeworks assignments (100pts) - each 25pts.

None of the grades will be curved.

Final grade computation During the session you can earn 300pts. The grade will be determine in the following way: $\#$ of earned points divided by 3 = % grade.

The % grade is translated into a letter grade in a standard way i.e.

100 – 94 % is *A*, 93 – 90 is *A-*,
89 – 86% is *B+*, 85 – 83 % is *B*, 82 – 80 % is *B-*,
79 – 76 % is *C+*, 75 – 73 % is *C*, 72 – 70 % is *C-*,
69 – 60 % is D range and F is below 60%.

ACADEMIC INTEGRITY STATEMENT (Adopted by the Undergraduate Council September 12, 2006)

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

Stony Brook University Syllabus Statement If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or <http://studentaffairs.stonybrook.edu/dss/>. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website: <http://www.sunysb.edu/ehs/fire/disabilities.shtml>

RESEARCH PRESENTATION (75pts) Each student has to deliver a a 30- 40 minutes) presentation on a chosen topic of AI.

You can do it also in a team of two, if needed. In this case a team presentation should last twice as long.

It can be a presentation of a software involving AI techniques, of a product that uses an AI techniques, of a research paper, or an overview of an AI subject not covered in the class. It also can be a AI related science fiction book or a movie that are using AI themes and techniques.

Search the WEB, look in for the papers, books- anything goes!

It has to be YOUR own vision of what you think is interesting in or about AI. Bring what you find interesting and share with us.

Students presentations are a VERY IMPORTANT part of the whole course design. You will bring us up date with AI technology, research, implementations, and trends!

GENERAL PRINCIPLES OF THE PRESENTATIONS

First slide must contain: the title (subject) of your presentation, your name(s), student ID, professor name, course number and the title.

Second slide must contain ALL sources you used for the your presentation. The course book, or lecture notes is included. In the case of the book the reference you have to put are title of the chapter, sections and pages numbers.

Third slide is an OVERVIEW of your presentation.

Remember to include a source of any picture, of slides copied from a source or any DIRECT citation on the bottom of each of your slides where it appears. REFERENCES are very important. You must be clear about the distinction between the information from a source and your own statements.

A hard copy (black and white in slide spread format) of the presentation slides and the CD containing the presentation is to be delivered o the Professor **before the presentation** starts.

All materials must be put in a **Presentation Folder** labeled with student name, ID and the title.

You receive 0-10pts for the organization of your submitted materials.

It is a presenter responsibility to STRUCTURE the presentation to fit the time framework.

Remember to leave some time for students (and professor) questions and discussion.

Practice and time your presentation before you present it in the class.

The Power Point file of the presentation has to be send to the Professor, within 3 days of the presentation. The 3 days may be needed to do some improvements after the presentation. In this case make a new CD and give it to Professor.

ALL PRESENTATIONS will be available on the web for other students to learn the material.

Students must attend the presentations to learn the material, but by having access to already delivered (and if needed, improved) presentations they will be able to to comprehend better the material and improve their own presentation skills.

PROJECT and PROJECT PRESENTATION (50pts) Each student, or a group will have to deliver a formal, power point presentation of the project. This is a short 10-15 minutes presentation. The organization of the presentation and submitted materials are the same as in the case of research presentation.

MIDTERM/FINAL (75pts) The Midterm/Final test will be distributed the week before of end of the classes and due on the official date of the final, or anytime before.

HOMEWORKS(100pts) There will be 4 Homeworks, 25pts each.

Class attendance is the most important, as students presentations are integral and as important part of the course design as Professor's lecture.

Students Presentation Schedule

PRESENTATION PROPOSAL due **THURSDAY, SEPTEMBER 18**

Presentation 1 Title: t.b.a **Thursday, October 8**

Presentation 2 Title: t.b.a **Thursday, October 22**

Presentation 3 Title: t.b.a **Thursday, November 5**

Presentation 4 Title: t.b.a **Thursday, November 19**

Thanksgiving Break November 25- 29

Presentation 5 Title: t.b.a **Thursday, December 4**

PROJECT PRESENTATIONS December 7, 10

Homeworks and Tests Schedule

Homework 1 due **Tuesday, September 22**

Homework 2 due **Tuesday, October 20**

Homework 3 due **Thursday, November 17**

Homework 4 due **December 1**

PROJECT DATA (Project Homework) due **Thursday, December 3**

FINAL will be distributed December 4. It is a take home test and is due on the day of **OFFICIAL FINAL**, or any day before.

Course Contents

The book is very thin. It is a short overview of major areas of AI. I will supplement it with **LECTURE NOTES** for detailed information. In particular we will cover all or majority of the following chapters and subjects (not always in the order they are listed).

Chapter 1 AI history and applications. Lecture Notes, **EXTRA** Handout 1,2 distributed in class.

Chapter 2 Knowledge Representation and Inference. Propositional and Predicate Calculus will be presented in detail **SEPARATELY**. Lecture Notes, Extra Handout 3 distributed in class.

Chapter 3 Expert Systems. Overview of EXPERT SYSTEMS Design and Technology. Lecture notes, EXTRA HANDOUT 4 distributed in class.

Chapter 2- Logic Details for Chapter 2. Overview of Propositional and Predicate Logic; Predicate languages and basic LAWS of Quantifiers; Predicate Logic Arguments. EXTRA HANDOUTS and Lecture Notes.

Automated theorem proving 1 DETAILS for Chapter 2: Propositional Resolution. EXTRA HANDOUTS and Lecture notes.

Chapter 5 Natural Language Processing- reading assignment.

Chapter 7 Machine Learning - concentration on INDUCTIVE, or CLASSIFICATION Learning.

In particular we cover the following techniques.

Decision Trees - detailed algorithm on lecture slides posted on the web and intuitive introduction is in the book.

PROJECT on Decision Tree Induction due July 9.

Neural Networks - detailed algorithm on lecture slides on the web and intuitive introduction in the book.

Genetic Algorithm - detailed algorithm on the lecture slides on the web and intuitive introduction in the book.

Chapter 8 Agent and Robots - readings.

New Advances Students presentations.

CSE532 Artificial Intelligence PROJECT DESCRIPTION

BAKARY DATA - on the course web page.

This is a classification data with TYPE DE ROCHE (Rock Type) as a CLASS attribute. There are 98 records with 48 attributes and 6 classes.

Classes are:

C1 : R. Carbonatees AND R. Carbonatees impures

C2 : Pyrate

C3 : Charcopyrite

C4 : Galene

C5 : Spahlerite

C6 : Sediments terrigenes

Most important attributes (as determined by the expert) are: **S, Zn, Pb, Cu, CaO+MgO, CaO, MgO, Fe2O3**

This is a real life experimental data and it contains a lot of missing data (no value).

THE PROJECT GOAL is to use different Internet based CLASSIFICATION TOOLS (choose one you like) to generate sets of DISCRIMINANT RULES describing the content of the data.

The project has to follow all steps of Learning Process:

Data Preparation that includes attributes selection, cleaning the data, filling the missing values, etc...

Data preprocessing : must use at least 2 methods of data discretization, and compare the final results obtained after each of them.

Learning Proper : for each experiment describe below use a classification tool for rules generation applied to the TWO sets of preprocessed data and compare the results.

Discriminant Rules Generation Experiments ; you have to perform 3 experiments (all on the same preprocessed data)

Experiment 1 : use all records to find rules for the full classification; i.e. rules describing all classes **C1- C6** simultaneously.

Experiment 2 (contrast classification): use all records to find rules contrasting class **C1** with all others

Experiment 3 : repeat Experiment 1 for all records with the **most important attributes** only.

Write a detailed Project Description with methods, motivations, results and submit it to the Professor in a folder (and CD) on the day of your PROJECT PRESENTATION.

Project Presentation : each student, or a group will be given 10-15 minutes to present the project and results.