Fall 2010 MCS 5503

Intelligent Systems (*Artificial Intelligence*)

Lawrence Technological University, Department of Math and Computer Science

Day / Time: Tue & Thursday, 7:10~8:25 pm
Credit Hours: 3
Prerequisites: MCS 2534 (Data Structures) and (C++ or **Java**)
Lecture Room: M108 (from Aug. 31)

Course Description:
This course provides an introduction to artificial intelligence and computational intelligence. Topics covered include problem solving by searching, optimization methods, machine learning, robotics and AI, image processing, evolutionary computation, artificial neural networks, data mining, fuzzy logic, and collaborative systems.

Instructor: CJ Chung, Ph.D.
- Office Room: M219 (or S116D)
- Office Hours: Tue & Thu 6-7 pm
- Phone: (248) 204-3504; Fax: (248) 204-3518 (*this fax number is for the whole college and senders must place ATTN: Dr. Chung on the fax cover*)
- Dept. Secretary: (248) 204-3560; Math/CS Drop Box: in front of S120 door.
- Email: CHUNG@ltu.edu, Personal webpage at http://qbx6.ltu.edu/chung (syllabus, etc.)
- my.ltu.edu - Black Board (Discussion Board, Assignments, and Online Quiz, etc.)

Textbook: Artificial Intelligence: A Systems Approach by M. Tim Jones, Jones and Bartlett Publishers, Inc; 1st edition (December 26, 2008), ISBN-10: 0763773379, ISBN-13: 978-0763773373 *or*
Artificial Intelligence: A New Synthesis by Nils J Nilsson, Morgan Kaufmann Publishers, March 1998, 1-55860-467-7

Recommended Texts
- Artificial Intelligence, 3/e, 1992, 750 pages, Patrick Henry Winston, Massachusetts Institute of Technology, ISBN: 0-201-53377-4
- Artificial Intelligence: A Guide to Intelligent Systems, Michael Negnevitsky, 440 pages, 2nd edition (2005), Addison Wesley Publishing; ISBN: 0-321-20466-2, downloads from book website (1st ed)

Internet Resources
- The American Association for Artificial Intelligence (AAAI)
- AI topics
- IEEE intelligent systems

Course Goals
- To learn the foundations of Artificial Intelligence, Machine Learning, Computational Intelligence, SoftComputing (simulation of intelligence in computers) (60%)
- To apply theories and techniques to the development of practical Intelligent Systems such as **robotic systems** (40%)
- For grad students: to plan next classes such as MCS 6513 Advanced Topics in Intelligent Systems, MSCS Capstone Project I and II
- For undergrad senior students who are considering application for LTU's MSCS program: this class may be counted toward your graduate credits.

Class Topics [16 weeks, 31 classes + 1 final]
- Introduction: Introduction to Artificial Intelligence and Fundamental issues in Intelligent Systems

- Search and Optimization methods
  - Generate and Test and Problem Reduction
  - Nets and Space-State Search
  - Basic Search (Uninformed Search), Heuristic Search and Optimal Search
  - Nonlinear Numerical Function Optimization
  - Combinatorial Optimization
- Autonomous Robotics and AI
  - Group or distributed robotics
  - Collaborative robotics
- *Robotics Programming with L2Bot and NXTs (Handouts)*
- Knowledge representation and reasoning methods
- Evolutionary Computation
- Machine Learning
- Perceptrons and training Artificial Neural Nets
- Image processing and robot vision
- Fuzzy Logic (Handouts)

Tentative Class Schedule and Important Dates

Date	Topics	Note
8/25	Introduction to AI and Intelligent Systems	First day of Class
10/21	**Midterm**	
11/4	**IEEE SEM Conference *nVnRoboSumo* Competition**	U of M Dearborn, 5pm – 9pm, Dinner will be served during keynote address
11/18	**Last day to withdraw**	
12/9	Class Competition and/or Project demo	Management Atrium
12/16	**Written Final Exam**	

Grading: Total 200 points

- Homework assignments and project(s) - 100 points
- 1 midterm: 40 points
- 1 final (everything covered in class): 60 points

This score will be translated into a letter grade based upon the percentages given below. (F will be given to Grad students, if under 70%)

A	93-100%	**C**	73-76.9%
A-	90-92.9%	**C-**	70-72.9%
B+	87-89.9%	**D+**	67-69.9%
B	83-86.9%	**D**	63-66.9%
B-	80-82.9%	**D-**	60-62.9%
C+	77-79.9%	**F**	0-59.9%

Class Policies

- Attendance is essential to doing well in the course. The exam will focus primarily (but not exclusively) on material presented in the lectures.

- If you are unable to attend a meeting (*or* on-line meeting, possibly), it is your responsibility to obtain the material from other students, instructor, or from the web.
- Class events may be photographed and/or videotaped. Students are expected to give permission for this material to be printed, published, posted on the websites, and/or televised in the public forum.

Written Examination Policies

- There will be no makeup exams.
- Closed books, closed notes by default; and closed neighbors.
- See Policy on Academic Misconduct section below.

Homework Policies

- Homework programming assignments must be done individually, in general.
- Source codes must follow good programming standards such as commenting, indentation, and meaningful names, function/method size, and file size, etc.
- Must be submitted **before** or at the beginning of the class on the due date.
- Read the submission instruction carefully for each home work.
- Some home works are for class competitions. Winners will be recognized in various ways.
- See the Policy on Late homework or project and Policy on Academic Misconduct sections below.

Class Projects

Each student is expected to select a project from a list of suggested projects that will be given by the instructor. A student can bring her/his own project, which must be approved by the instructor in advance. Group projects may be possible, depending on the subject, size and scope. See also the "Policy on late homework or project" and "Policy on Academic Misconduct" sections below.

Policy on the late homework or project

- Full credit at the beginning of class on the due date
- 10% deduction per day (24 hours)

Intellectual Property and Copyrights

All the deliverables may be reused/modified/upgraded by another students and/or instructor later on for educational purposes. The instructor will make sure to give appropriate credits and acknowledgements to the student in that case. The instructor believes that the student has the intellectual property rights of the software student wrote. However, since it is done in a class at LTU, it is also requested that the student should give appropriate credits and acknowledgements to the University as well as the instructor, if the software is used or commercialized after the class.

Policy on Academic Misconduct

Each student must comply with the University Academic Honor Code at http://www.ltu.edu/currentstudents/honor_code_offenses.asp

8/31/10