1. General Information

**Instructor:**
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www.cs.utep.edu/ofuentes  
(915) 747-6956  
Office hours: Tuesdays and Thursdays 11:00-12:00 or by appointment, in CSB 208 (feel free to drop by at other times if I’m there).  
Chat: olacfuentes@gmail.com – feel free to ask questions if I’m available

**Teaching Assistant:**
Geovany Ramirez  
email: geoabi@gmail.com  
Office hours: by appointment, room 109D  
Chat: geoabi@gmail.com – feel free to ask questions if he’s available

**Meeting Times:**
MW 3:00-4:20, CSB 308

**Class webpage:**
www.cs.utep.edu/ofuentes/cs4320.html

2. Course Contents

1) Introduction  
a) What is A.I.?  
b) History

2) Problem Solving Methodologies  
a) Search-based Approaches  
i) Uninformed search  
   • Breadth first  
   • Depth first  
ii) Heuristic search  
   • Greedy best-first search  
   • The A* algorithm  
iii) Search for optimization  
   • Hill-climbing  
   • Beam search  
   • RANSAC  
   • Genetic algorithms  
   • Evolution strategy  
v) Constraint satisfaction  
v) Adversarial search
• The min-max algorithm
• Alpha-beta pruning

b) Data-driven Approaches: Machine Learning
   i) Instance-based Learning
   ii) Decision trees
   iii) Neural networks
   iv) Support Vector Machines
   v) Graphical Models
   vi) Ensembles

3) Application Areas
   a) Computer Vision
      i) Features
         • Eigenfaces
         • Haar features
         • The Census transform
         • Histograms of gradients
         • SIFT
         • SURF
      ii) Applications
         • Object detection
         • Object recognition
         • Tracking
   b) Natural Language Understanding
      i) Features
         • Bags of words
         • Eigentext
      ii) Applications
         • Text classification
         • Language modeling
   c) Spoken Language Understanding
      i) Features
         • Eigenvoice
         • Cepstral features
      ii) Applications
         • Person recognition
   d) Robotics
      i) Navigation
      ii) Mapping

3. Policies and Other Information

Pre-requisites:
Data structures is the only pre-requisite, knowledge of calculus, linear algebra, probability and statistics is useful.

Grading:

CS4320
2 Midterm exams 12.5% each
Homework and Programs 30%
Final exam 20%
Course Project 25% (proposal, halfway point progress report, final presentation, final report)

CS5114
2 Midterm exams 10% each
Homework and Programs 30%
Final exam 15%
Paper presentation 5%
Course Project 30% (proposal, halfway point progress report, final presentation, final report)

The nominal percentage-score-to-letter-grade conversion is as follows:
90% or higher is an A
80-89% is a B
70-79% is a C
60-69% is a D
below 60% is an F

Extra Credit: For each lab and project, the TA and instructor will select a submission for the “Best Lab Award”, which will receive 20% extra credit and bragging rights.

Cellular phone usage is prohibited.

Laptops are allowed (please turn sounds off) to take notes and run sample code, but a student using his/her laptop for non-class related purposes will be asked to leave.

**Policy on Collaboration**
Collaboration is strongly encouraged.
It is OK to:
- Talk with other students about approaches, ideas
- Get ideas and extra information from the internet, books, etc.
- Get code from example programs – but you MUST reference the source, otherwise the code is deemed to be plagiarized

However, it is not OK to:
- Share code with another student (if a piece of code is submitted by more two or more students, all students involved are cheating, regardless of who wrote the original code)
- Use ideas or code acquired from another source without attribution
- Copy text from other sources
- Look at another student’s code
- Debug another student’s code

**Text**
There’s no official textbook for this class. Materials will be taken from various books and papers from the research literature.

**Tools**
- Weka
- OpenCV
- Matlab
Disabilities
If you feel that you may have a disability that requires accommodation, contact the Disabled Student Services Office at 747-5184, go to Room 106E Union, or email dss@utep.edu

4. Lab Submission Guidelines

Lab assignments and deadlines will be posted on-line.

For each lab assignment, submit by email a written report and source code to both the T.A. and instructor.

Each lab grade will be computed from the following elements:
- Report (80% of grade)
- Source code (20% of grade)

Report

You must submit a printed report describing what you did for the lab. Your grade will be computed mainly from this report, so it’s important that you carefully document what you did. Your code will be used to verify your experimental results, to clarify doubts we may have, and to assess efficiency of implementation and programming style.

Your reports must include the following items:
- **Introduction** – Brief description of the problem you are trying to solve and the approach you are using to solve it.
- **Proposed solution** – How did you solve (or attempt to solve) the problem? Provide an informal, high-level description of algorithms and data structures used.
- **Implementation** – Description of your code (not the actual code). Explain the design choices you made, including how you broke the program into modules, your user interface, input and output, etc.
- **Experimental results** – Describe the experiments you performed to test your program. The experiments must be described in a way that allows anybody to replicate them using your code. Show sample images produced by your program (very important for the “best lab award”).
- **Conclusions** – Explain what you learned from the project. If you did not achieve all the stated goals of the project, mention that here. Also, if you did work in addition to the requirements mention that here, too.

While the most important factor to consider in grading is whether the project’s goal were attained, we will also take into consideration the following:
- Completenss - Does your report cover all required aspects in enough detail?
- Clarity - Are those aspects clearly explained?
- Language - Is the report written with proper grammar and spelling?
- Presentation - Is the formatting appropriate?

Source Code

In addition to program correctness and consistency with reported results, we will assess the following:
- Efficiency - Are the methods implemented optimal/near optimal in terms of time and space?
- Design - Are operations broken down into methods in a reasonable way?
- Style - Is the program indented correctly and consistently? Do methods and variables have meaningful names?
• Robustness - Does the program handle erroneous or unexpected input gracefully?
• Documentation - Do all program files begin with a comment that identifies the course, author, assignment, instructor, T.A., date of last modification, and purpose of program? Are all methods clearly documented? Are all non-obvious code segments clearly explained?

Policy on late projects:
Lab project grades will be reduced by a factor of 8% for each working day they are late. Unless otherwise stated, labs are due at 11:59 p.m. on the due date.

5. Standards of Conduct and Academic Dishonesty

You are expected to conduct yourself in a professional and courteous manner, as prescribed by the UTEP Standards of Conduct. Academic dishonesty includes but is not limited to cheating, plagiarism and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying data (for example program outputs) in laboratory reports. Plagiarism occurs when someone represents the work or ideas of another person as his/her own. Collusion involves collaborating with another person to commit an academically dishonest act.
Professors are required to - and will - report academic dishonesty and any other violation of the Standards of Conduct to the Dean of Students.