# Seminar on Genetic Algorithms

Sushil J. Louis
http://www.cse.unr.edu/∼sushil
MSS 101 (784-4315)

## TextBooks

- **Required:** David E. Goldberg, *Genetic algorithms in search, optimization and machine learning,* 1989, Addison-Wesley.
- **Recommended:** David Fogel, *Evolutionary Computation* Towards a new Philosophy of Machine Intelligence, 1995, IEEE Press.
- **Recommended:** John Holland, *Adaptation in Natural and Artificial Systems*, 1992, The MIT Press.
- **Recommended:** John Koza, *Genetic Programming*: On the Programming of Computers by Means of Natural Selection, 1992, Bradford Books.
- **Recommended:** Melanie Mitchel, *An Introduction to Genetic Algorithms*, 1996, The MIT Press.

## Office hours

- MTW from 11 a.m. - 12:00 a.m. And by appointment. Send email to sushil@cse.unr.edu

## Syllabus

I will introduce genetic and evolutionary computing algorithms and their theory in the first four weeks of the course. You will read, analyze, and present research papers both classic and recent on genetic algorithms. During this time you will also begin work in teams on a mutually agreeable research problem or project. The last four to six weeks will be spent on your research projects. You are welcome to work on areas that interest you, but you need to talk to me first. This semester I am most interested in game related projects, co-evolution, and in systems that combine genetic algorithms with case-based reasoning to learn from a (human) teacher. Please talk to me soon about projects – the sooner you get started the better you will do.

There are several ways to do well in this class.

- **Research:** Do publishable research. If you don't know how to do research this course will also teach you how. You will investigate a research problem that I **think** I understand and to which I am reasonably sure a solution exists.
- **Development:** Develop an industrial strength prototype of the demos on my web page. Your code will implement the best known evolutionary algorithm for the problem at hand and will be runnable like the demos.
- **Research and Development:** Attack a well defined sub-problem (I **know** this problem can be solved and probably how to solve it) and distribute a demo of your work on the web.

Groups are encouraged but need my permission. Project presentations will be at the end of the semester. While working on your problem, you will be asked to find, read, and present papers pertaining to your problem, or that you find interesting. Become familiar with library and internet resources. In addition to your presentations, there may be research presentations from graduate students, faculty, and other speakers.

Finally, you will learn how to efficiently read technical papers, write technical reports, present technical work, and perform scientific research and development. I **encourage and require** enthusiastic class participation.

Please look in `http://www.cse.unr.edu/~sushil` for pointers to papers and other information useful for this course. I would like each of you to set up a web page and keep a pointer to your work (graphical and textual).

If you do not already have one, you will need to get an account on CSE department machines. Do this at the end of the first class. To get a CSE account, go to http://www.cse.unr.edu/department/support/account-obtain.html

Your grade will depend on assignments, presentations, and project reports. I will expect to see you after each presentation to discuss the presentation and assign you a grade. **Any person or group producing publishable work gets an automatic A.**

Your grade will be calculated from the following table.

| Item | Percentage |
|---|---|
| Assignments | 20% |
| Presentations | 20% |
| Project and Report | 60% |

## Communications

If I need to communicate with the class as group I'll place a notice on the class web page. You are required to check the website and your email every day - I will send email to your CS email address. Get yourself a cs account and implement mail forwarding if you need to. Other Internet resources can be found on the class web page

This is a research oriented class. Research projects or research and development projects that you start in this class will usually constitute the bulk of a Master's or Ph.d. thesis or professional paper.

## Services

Academic Success Services: Your student fees cover usage of the Math Center (784-4433 or www.unr.edu/mathcenter/), Tutoring Center (784-6801 or www.unr.edu/tutoring/), and University Writing Center (784-6030 or http://www.unr.edu/writi These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

## Video/Audio Recording

Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy.

This class maybe videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may berecorded.