

Psychology 465A (3 credits)
Computers in Psychology
Class and Lab Tuesday, Thursday 2:00-3:30 Swing 409

Course Outline Fall 2007

Professor:

Dr. Lawrence M. Ward
Office: Kenny 3529 (Office hours by appointment)
Phone: 822-6309
Email: lward@psych.ubc.ca

Teaching Assistant:

Shahab Ghorashi
Kenny 3514
604-822-6634
ghorashi@interchange.ubc.ca

Course Description: This course provides an introduction to some of the ways in which computers are used to create and study models and theories in psychology. This is not a course in computer programming. If you haven't had a course in computer programming already, it is still possible to do this course but you will have to do extra work mostly on your own to learn the basics. In the classroom the emphasis will be on conceptual understanding of computers and computing, theory- and model-building in psychology, and of three classes of psychological theory and model building: stochastic, nonlinear dynamic, and connectionist. Lab exercises are aimed at developing modelling skills in each of the three model classes. The conceptual and practical aspects will be united in a final modelling project.

Prerequisites and restrictions: This course is intended for students who wish to study how computers can be used to create and study models and theories of psychological processes. Some programming experience is required or must be gained early in the course, as lab exercises require simple numerical programming skills.

Format of the course: For the first several weeks, there will be classes on both Tuesdays and Thursdays. Later in the term such weeks will alternate with weeks during which there will be class on some days (usually Tuesdays) and lab on others (usually Thursdays). Lecture material and lab assignments will be available in pdf format on the Internet. Go to the Psychology webpage <<http://www.psych.ubc.ca/>> and click on "Online Course Material" and then click on my name beside the Psych 465A listing. Regular classes will be lecture/discussion and labs will be individual work with help from me and from the TA and will refer to the pdf lecture notes. Suggested readings are available in the library. They are useful but not strictly required. Grading will be based on three lab assignments (results of simulations plus a short essay each) and one final project (results of simulations plus a longer essay).

Policies: Academic dishonesty (plagiarism or cheating, including collaboration or hiring outside programming consultants for assignments) will not be tolerated; consequences include receiving zero marks on the affected assignment, reporting to the

President's office, and possible expulsion from UBC (see Page 50 of UBC Calendar, section on "Student Discipline"). See Faculty of Arts booklet on plagiarism (available in Bookstore for \$3.00) for information on how to avoid it. The Department of Psychology subscribes to the "Turn-It-In" web-based plagiarism detector service. Both hard-copy and electronic versions of all assignments are required to be turned in so that assignments can be scanned by this service. Unexcused late assignments will be marked according to a more stringent standard than on-time assignments, always involving loss of marks. Only doctor-validated medical excuses will be accepted for late assignments to avoid loss of marks. Students should retain a copy of all submitted assignments (in case of loss). Questions and comments are welcome and encouraged in both regular and lab classes.

Grading

SDT lab project	20 points
Chaos lab project	20 points
Connectionist lab project	20 points
Final Project	<u>40 points</u>
Total =	100 points

Suggested readings (available at Koerner, Woodward or Main Library)

- Apter (1970) *The Computer Simulation of Behavior*. Hutchinson.
- Boden, M. (1988) *Computer Models of Mind*. Cambridge University Press.
- Coren, Ward & Enns (2004) *Sensation and Perception 6E*. New York: Wiley.
- Freeman, J.A. (1994) *Simulating Neural Networks with Mathematica*. Reading, MA: Addison-Wesley.
- Green & Swets (1966) *Signal Detection Theory and Psychophysics*. Krieger.
- Lehman (1977) *Computer Simulation and Modeling*. Erlbaum.
- Parks, Levine & Long (1998) *Fundamentals of Neural Network Modeling: Neuropsychology and Cognitive Neuroscience*. Cambridge, MA: MIT Press.
- Rumelhart & McClelland (1986) *Parallel Distributed Processing*. Cambridge, MA: MIT Press
- Steinhauer (1986) *Artificial Behavior: Computer Simulation of Psychological Processes*. Prentice-Hall.
- Uttal (1968) *Real-time Computers*. Harper & Row.
- Ward, L.M. (2002) *Dynamical Cognitive Science*. Cambridge, MA: MIT Press

Schedule of Classes, Labs and Readings

1. **Theories and models, computers, computer simulation, random processes: Sept 4, 6, 11, 13, 18, 20**
 - 1.1 Suggested reading
 - 1.11 Apter; Boden; Lehman; Steinhauer; Uttal.
 - 1.2 Lab
 - 1.21 No lab

2. **Simulating Signal Detection Theory: Sept 25, 27, Oct 2, (L4), 9, (L11)**
 - 2.1 Suggested reading
 - 2.11 Coren Ward & Enns, pages 18-24; Green & Swets
 - 2.2 Lab (dates indicated with L(date))
 - 2.21 SDT project due 15 Oct

3. **Simulating Chaos: Oct 16, L(18), ~~23~~, L(25), 30, Nov (L1)**
 - 3.1 Suggested reading:
 - 3.11 Ward
 - 3.2 Lab
 - 3.21 Chaos project due 5 Nov

4. **Simulating Neural Networks: Nov 6, 8, 13, (L15), 20, (L22)**
 - 4.1 Suggested reading
 - 4.11 Rumelhart; Parks
 - 4.2 Lab
 - 4.21 Neural network project due 26 Nov

5. **Final project: Nov 27, 29**
 - 5.1 Individual consultations scheduled during class times
 - 5.2 Due 17 December 2004