Study Guide for Exam 1
Exam Date: 10 February 2006

One of the TAs will hold a study session on Thursday, February 9 from 3:00-4:15 pm in PRCE 277.

The exam will include 25 multiple choice questions worth 2 points each, and 5 short answer questions worth 10 points each. Total points on the exam is 100. This exam makes up 20% of your class grade.

You are responsible for knowing both the material in the textbook and in lecture. The exam will draw from both sources.

Bring a calculator that can compute the arc tangent (atan) function!

At the end of each chapter in the textbook there are study questions. Use these as you prepare for the exam. If you can answer these questions, you will be in good shape for the material drawn from the textbook.

In addition, I have provided below similar kinds of study questions for material from the lectures. I am not including questions that I think are already covered by those in the textbook. Note, this means that my idea of a good answer to a question in the textbook might also draw on material from lecture.

Lecture 2
1. What is psychophysics? How is it different from philosophical studies of perception?
2. How does the method of limits work to measure perception?
3. When might you want to measure a threshold, percentage correct, or reaction time?

Lecture 3
1. What is the relationship between the wavelength of light and perceived color?
2. What do the terms illuminant, luminance, and candelas per meter squared mean?
3. How do we measure the strength of a source of light?
4. Why is the pupil of the eye black, but glows red in photographs?

Lecture 4
1. How does an ophthalmoscope work? What does it do?
2. Be able to compute the visual angle of a stimulus when given it’s physical size and distance from the eye.
3. Discuss the blind spot experiment in CogLab and the results found for the class average. Where the data what we expected? Were there any deviations from what was expected?
Lecture 5
1. What do the numbers in 20/20 vision mean?
2. Why is the world not upside down, small, reddish, blurry, or filled with holes?
3. Describe the difference of Gaussians model of ganglion receptive fields. What exactly is being modeled?

Lecture 6
1. Explain how a ganglion cell’s response is computed with the difference of Gaussian’s model.
2. Discuss how the ganglion cell’s response varies with different stimuli.
3. Explain how a layer of activity allows us to “see” the activity pattern of ganglion cells.
4. How do ganglion cell responses depend on the size of the receptive field?
5. How do ganglion cell responses provide an explanation of the brightness contrast illusion?
6. How do ganglion cell responses provide an explanation of the Hermann grid illusion?

Lecture 7
1. How does the visual cortex represent information about visual stimuli?

Lecture 8
1. What does Fourier analysis do?
2. What do we mean when we say that a function can be described in terms of space or in terms of Fourier components?

Lecture 9
1. What is the contrast sensitivity function, and how does it depend on spatial frequency?

Lecture 10
1. How do the responses of ganglion cells provide a partial explanation of the Crak-O’Brien-Cornsweet illusion?
2. How do the responses of orientation sensitive cells in visual cortex provide a partial explanation of the perceived orientation of Glass patterns?

Lecture 11
1. How does a neuroscientist identify the “critical features” that drive a neuron that responds to complex forms.
2. Be able to describe face adaptation effects and what they mean about the representation of faces in visual cortex.

Lecture 12
1. Why might cells in IT respond best to such odd kinds of stimuli?
2. How might Fourier analysis provide features for object representation?