

# Mind In The Machine

*A Course In The Upper Division General Education Honors Theme*  
Spring 2007

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**Cross-listed Course Number:** PSYC 332H / CSCI 313H

**Class Days and Times:** Tuesday & Thursday; 9:30-10:45

**Location:** O'Connell Technology Center (OCNL) 237

**Instructors:** Dr. Vela - Department of Psychology; MODOC 110  
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**Readings:** *Consciousness: An Introduction* by Susan Blackmore  
Oxford University Press, 2004.  
*On Intelligence* by Jeff Hawkins, Owl Books, 2004. <http://www.onintelligence.org/>  
Select articles from Hans Moravec, Bill Joy, and Ray Kurzweil (see WebCT page links)  
<http://www.kurzweilai.net>

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## About the Course

What is consciousness? What does it mean to have a 'mind'? What is intelligence? Is it possible to create an artificial mind, one that feels, thinks, and "experiences" the world? Some people believe that the question of machine consciousness is already answered: our brains ARE machines and clearly WE have consciousness. What is your gut reaction to this suggestion? What is YOUR notion of mind?

In *Mind in the Machine* we consider how modern biologists, psychologists, philosophers, and computer scientists attempt to answer these questions. In the process the conceptual difficulties involved will be brought into sharp relief and it will become clear that pedestrian notions of mind simply cannot be supported by empirical evidence, much as evidence in modern physics has shown that the world is not ultimately Newtonian but rather operates according to the strange quirky counter-intuitive rules of quantum physics (or some other as-yet-discovered exotic set of rules). As we shall see, the conundrum of consciousness has produced Gordian knots of counter-intuitive and paradoxical answers. Things are not as they seem. Be prepared for an interesting intellectual ride...and be prepared to have some of your cherished notions of consciousness, mind, and machine challenged.

Success of this *honors* course will depend heavily on your participation, insight, and motivation. There will be no exams. Grading will be based on a) participation in class discussions, b) submitted "Think Pieces" for each of the readings, c) the quality and preparation involved in the article presentation you will lead, and d) a 3 - 5 page paper, due at the end of the semester, outlining your view of mind. The format of the course will be seminar in nature; the instructors will not lecture *per se*.

## General Topic Areas Covered in the Course

The question of consciousness requires every intellectual tool that we can muster. Contributions from evolutionary biology, philosophy, experimental psychology, and computer science will all be considered.

Evolutionary biology provides a unifying framework from the *natural sciences* to help understand why consciousness evolved and what it is good for.

Philosophical analyses represent contribution from the *humanities* that help us to formulate the questions and specify conceptual issues that constrain and guide our views of consciousness. The mind-body problem is a recurrent theme, and one whose resolution has yet to reach consensus.

Experimental psychology represents input from the *social sciences* whose main contribution is an empirical analysis of the problem of consciousness. For instance, what is the relationship between brain physiology and consciousness? Adherence to the scientific method and controlled experiments are a hallmark of this approach.

Computer science deals with the *technical issues* associated with instantiating intelligent, useful, and perhaps even conscious processes in artifacts: machines that are constructed by humans. Engineering mind-like processes and creating intelligent machines provides a mechanism where philosophical analyses and empirical findings can be put to the test.

## Course Objectives

*Knowledge Objectives* - an understanding of the "problem"; an understanding of philosophical positions on the problem of consciousness; understanding differences between intelligence, mind, and consciousness; understanding evolution and the emergence of consciousness, a basic understanding of physiological correlates of consciousness; an understanding of issues associated with the instantiation of intelligent-like abilities in machines; a re-acquaintance with one's own mind.

*Skill Objectives* - competent use of multimedia to conduct professional presentations; enhancement of public speaking skills; ability to organize and oversee small group discussion sessions; use of professional databases to conduct literature searches; concise and clear writing.

## Course Requirements

### Seminar presentations (30% of course grade)

You will be responsible for leading the discussion of one of the book's chapters or an outside article. Be prepared to present for 30 – 45 minutes. *You are required to give a 'formal presentation'... meaning presentation software or a professional alternative.* Be professional and be prepared.

Your presentation will summarize important aspects of the reading you are covering; however, we urge you to use outside sources to help prepare your presentation. *Approach your chapter presentation as if you were the expert on that chapter. **You need NOT reiterate everything in the chapter** (you should assume your audience has read it and grasped the fundamentals of the chapter); rather, clarify the main ideas and points that were especially important to you.* Look up related information on the web or in books or articles for those concepts that seem unclear to you. Include a list of references.

An essential part of your presentation involves **eliciting classroom discussion/comments/activity** on some aspect of the reading you are covering. You can do this by simply inserting questions directed to the class. Do this at least twice *during* your presentation. If you choose, you can instead punctuate your presentation with a brief demonstration of a concept or phenomenon discussed in your chapter.

Included in your presentation is a "**FOCUS ON**" section where you select something you found particularly interesting or relevant in the reading. For example, you may want to delve more deeply into a study cited in your chapter, demonstrate a phenomenon, or profile a scientist referenced in the chapter. Whatever approach you take, the information you present must be based on 'extra material' not found in the book; **you must present information not found in the primary reading.**

**Use auxiliary devices (videos, the web, music, artifacts, etc.) to augment your presentation.** Extra credit points can be earned by adding ancillary material to your presentation, so long as they help to clarify the concepts and bring relevancy and interest to the topic. Analysis is expected.

**Creativity:** Presentations should be unique and reflect your personal strengths as a scholar/intellect/leader. Entertain creative methods to engage your audience, and bring your own unique qualities to the presentation ... scenarios may include demonstrations, role-playing, skits, games, art, music, debate, etc.

At the end of your formal presentation (30 – 45 min) students should be directed to form into small groups (typically no more than four). Students shall discuss a question/comment/exercise that you provide in your handout (15 – 20 minutes; see details below). The class should then reconvene and you will coordinate **small group discussion** reflections/conclusions to the class at large (20 – 30 min).

The semester readings will be divided among students in the class. However, everyone should read all chapters and articles; the presenter is not supposed to teach the material; but rather, provide an overview and discussion of the material and then coordinate small group activities. The presenter should provide a **2-3page handout** with the following information (minimum):

- Your *name, date, title, author, and chapter number/reading* being presented
- 1 paragraph *abstract* that summarizes the chapter/article, in your own words.
- Outline of major points presented in the chapter/article
- At least two specific questions/comments/demonstrations derived by you and included in your presentation.
- A "**Focus On**" section that brings in **related external material**, to expand upon or enhance understanding of one of the studies/concepts referred to in the chapter, demonstrates a phenomenon, or profiles one of the people referred to in the chapter. This is an important part of your presentation. The information you present should augment the information in the reading for that day, and while it should be related to the chapter it should also bring in new information to share with the class, from an external source(s).
- **Three web-site sources** (including URL's and a summary of the information available on the web site) related in some way to your presented material. References for any other sources used.
- **Question/scenario/comment/skit/game/ or creative exercise** that students are to consider during their small group discussion/activity.

### **Think Pieces (30% of course grade)**

During most class meeting of each week you are required to turn in a typed double-spaced (10 - 12 pitch font; one-inch margins) 'Think Piece'. Each Think Piece should be based upon the reading for that day; the content should reflect your thoughtful consideration of some aspect of the reading. Think Pieces are not summaries; they should be thoughtful reflections.

Think Pieces should be at least one full page in length and will be graded as pass/fail. No hand written papers will be accepted. Do not send us Think Pieces as attachments to an email. Turn in Think Pieces yourself; do not give it to another class member turn in for you; submission of Think Pieces provides evidence of class attendance. Each Think Piece not turned in will reduce your Think Piece grade by 5 percentage points. However, you are allowed four *free* Think Pieces; that is, you are allowed to not turn in four Think Pieces throughout the semester with no penalty. *You are not required to turn in a Think Piece for the material you present.* No late Think Pieces will be accepted.

### **Discussion (30% of course grade)**

Your participation in classroom discussions is vital (20%). You will be expected to contribute during general class discussions and in small group discussions. Be prepared to contribute in a substantive way. Your own Think Pieces are a good source of discussion material. Attendance, enthusiasm, and a positive attitude are encouraged.

Additionally, you will be required to contribute to online discussions based on the outside reading of *On Intelligence* (10%). Starting with the third week, you are required to post at least one paragraph comment on designated chapters from Jeff Hawkins's book. Only posts based on the specified chapter/pages will be counted. The posts must be dated no later than Friday 5pm of each week. Posts should be made to our WebCT Bulletin Board.

There are a total of 8 chapters, but we have divided up the readings into sections such that there are 12 weeks of required postings (beginning with week 3, see the semester calendar for the specific chapter/pages and week information). You are also required to post a minimum of 12 "response posts" to someone else's original posting. These "response posts" can be based on any of the previous weeks "original posts". So, you will make at least 12 original posts during the semester and 12 additional posts that are responses to someone else's original post. This aspect of your discussion-related grade will be reduced by 1% (up to a max of 10%) for each post below the 24 minimum. We will review the posts but not respond. The online discussion is intended to encourage thoughtful interactions among class members. We reserve the right to not count a post if deemed gratuitous, too brief, or superficial.

### **Final Paper (10% of course grade)**

Your final paper is due in class the day of our regularly scheduled final (Tuesday, May 15, 12 – 1:50). The paper should be a 3 - 5 pages in length, and be in essay format. Answer the following questions:

- What does it mean to be an *intelligent being*? A *sentient being*? To have a *mind*? A *consciousness*?
- Can a *machine* have any of these qualities? Which? What about a *computing machine*?
- How have your view changed since the beginning of the semester?

Your response should be clear, logical, and free from baseless assertion or opinion. Use reason and refer to any of the ideas, experiments, theories, or data covered or discussed during the semester. Cite specific authors and works.

# S e m e s t e r   C a l e n d a r

## **Week 1** (January 23rd & 25th)

Introductions; course requirements; selection of presentation topics; activity

## **Week 2** (January 30th & February 1st)

Basic concepts in AI (Renner); Discussion/demonstration of perceptual phenomena (Vela)

## **Week 3** (February 6th & 8th; *online posting Prologue & Chapter 1*)

WebCT **Online Discussion** begins for “*On Intelligence*”. Posts due by Friday 5:00pm for each of the associated weeks

- Tuesday, Feb. 6th

Chapter 1: What's the problem?

*Discussion Leader:* \_\_\_\_\_

- Thursday, Feb. 8th

Chapter 2: What is it like to be...?

*Discussion Leader:* \_\_\_\_\_

## **Week 4** (February 13th & 15th; *online posting Chapter 2*)

- Tuesday, Feb. 13th

Chapter 3: What does consciousness do?

*Discussion Leader:* \_\_\_\_\_

- Thursday, Feb. 15th

Chapter 4: Attention and timing

*Discussion Leader:* \_\_\_\_\_

## **Week 5** (February 20th & 22nd; *online posting Chapter 3*)

- Tuesday, Feb. 20th

Chapter 5: The theater of the mind

*Discussion Leader:* \_\_\_\_\_

- Thursday, Feb. 22nd

Chapter 6: The grand illusion

*Discussion Leader:* \_\_\_\_\_

**Week 6** (February 27th & March 1st; *online posting Chapter 4*)

- Tuesday, Feb 27th  
“AI, The Movie” (select clips)

- Thursday, March 1st  
“AI, The Movie”

*Discussion Leader:* \_\_\_\_\_ Renner / Vela \_\_\_\_\_

**Week 7** (March 6th & 8th; *online posting Chapter 5*)

- Tuesday, March 6th  
Chapter 7: Egos, Bundles, and Multiple Selves

*Discussion Leader:* \_\_\_\_\_

- Thursday, March 8th  
Chapter 8 : Theories of Self

*Discussion Leader:* \_\_\_\_\_

**Week 8** (March 13th & 15th; *online posting Chapter 6, pgs. 106-125*)

- Tuesday, March 13th  
Chapter 9: Agency and Free Will

*Discussion Leader:* \_\_\_\_\_

- Thursday, March 15th

“Rise of the Robots”, Hans Moravec  
<http://www.frc.ri.cmu.edu/~hpm/project.archive/robot.papers/1999/SciAm.scan.html>

*Discussion Leader:* \_\_\_\_\_

**Week 9** (March 19th - 23rd)

***SPRING BREAK***

**Week 10** (March 27th & 29th; *online posting Chapter 6, pgs. 125-150*)

- Tuesday, March 27th

Chapter 10: The Evolution of Consciousness

*Discussion Leader:* \_\_\_\_\_

- Thursday, March 29th

Chapter 11: The Function of Consciousness

*Discussion Leader:* \_\_\_\_\_

**Week 11** (April 3rd & 5th; *online posting Chapter 6, pgs. 150-176*)

- Tuesday, April 3rd (Week 11)

Chapter 12: Animal Minds

*Discussion Leader:* \_\_\_\_\_

- Thursday, April 5th

Chapter 13: Minds and Machines

*Discussion Leader:* \_\_\_\_\_

**Week 12** (April 10th & 12th; *online posting Chapter 7, pgs. 177-193*)

- Tuesday, April 10th

“Gelernter, Kurzweil Debate Machine Consciousness”, Brooks, Kurzweil, Gelernter  
<http://www.kurzweilai.net/meme/frame.html?main=memelist.html?m=4%23688>

*Discussion Leader:* \_\_\_\_\_

- Thursday, April 12th

Chapter 14: Can a Machine Be Conscious?

*Discussion Leader:* \_\_\_\_\_

**Week 13** (April 17th & 19th; *online posting Chapter 7, pgs. 193-204*)

- Tuesday, April 17th

Chapter 15: How to Build a Conscious Machine

*Discussion Leader:* \_\_\_\_\_

- Thursday, April 19th

“Why the Future Doesn't Need Us”, Bill Joy <http://www.wired.com/wired/archive/8.04/joy.html>  
(without infomercials: <http://www.primitivism.com/future.htm> )

*Discussion Leader:* \_\_\_\_\_

**Week 14** (April 24th & 26th; *online posting Chapter 8, pgs. 205-217*)

- Tuesday, April 24th

Chapter 16: The Neural Correlates of Consciousness

*Discussion Leader:* \_\_\_\_\_

- Thursday, April 26th

Chapter 17: The Unity of Consciousness

*Discussion Leader:* \_\_\_\_\_

**Week 15** (May 1st & 3rd; *online posting Chapter 8, pgs. 217-235*)

- Tuesday, May 1st

Chapter 18: Damaged Brains

*Discussion Leader:* \_\_\_\_\_

- Thursday, May 3rd

“Why We Can Be Confident of Turing Test Capability Within a Quarter of a Century”, Kurzweil  
<http://www.kurzweilai.net/articles/art0683.html?printable=1>

*Discussion Leader:* \_\_\_\_\_

**Week 16** (May 8th & May 10th)

- Tuesday, May 8th

Activities, demos, synthesis

*Discussion Leader:* \_\_\_\_\_ Renner / Vela \_\_\_\_\_

- Thursday, May 10th

Activities, demos, synthesis

*Discussion Leader:* \_\_\_\_\_ Renner / Vela \_\_\_\_\_

**Week 17** (FINALS WEEK May 14th – 18th)

\*\*\*\*\* FINAL EXAM WEEK \*\*\*\*\*

Final meeting; activity. Turn in your final paper.

(Tuesday May 15th; 12:00 - 1:50)

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