

# Mind In The Machine

[A Course In The Upper Division General Education Honors Theme](#)  
Spring, 2009

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

**Class Days and Times:** Tuesday & Thursday; 12:30-1:45

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

**Instructors:** Eddie 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 included page links)  
<http://www.kurzweilai.net>

## 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 contributions 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 a discussion of the **small groups'** reflections/conclusions with the class as a whole (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 expected to teach the material; but rather, to provide an overview and discussion of the material and then coordinate small group activities. The presenter should prepare a **2-3page handout** with the following information (minimum):

- Your *name, the date, and the title, author, and chapter number or reading* being presented
- A one paragraph *abstract* that summarizes the chapter/article, in your own words.
- An 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.

**You should upload your handout to Vista at least the day before your presentation.**

**Other students should print out and bring a copy to class the day of your presentation.**

### ***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 the Visa Discussion 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. While APA formatting is preferred, be sure that your paper is formatted according to the professional standards of your discipline. Late papers will not be accepted.



### ***Academic Honesty***

Please refer to the 2007-2009 University Catalog with respect to university policies concerning [academic honesty](#). Cheating in any form will not be tolerated. Violations of academic honesty will be pursued and enforced according to university guidelines.

### ***Disability Support Services***

Please refer to the 2007-2009 University Catalog for university policies, services, and eligibility concerning students who may be in need of [disability support services](#).

# Semester Calendar

## Week 1 (January 27<sup>th</sup> & 29<sup>th</sup>)

Introductions; course requirements; selection of presentation topics; activity

## Week 2 (February 3<sup>rd</sup> & 5<sup>th</sup>)

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

## Week 3 (February 10<sup>th</sup> & 12<sup>th</sup>; *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. 10<sup>th</sup>: **Chapter 1:** What's the problem?

*Discussion Leader:*

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- Thursday, Feb. 12<sup>th</sup>: **Chapter 2:** What is it like to be...?

*Discussion Leader:*

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## Week 4 (February 17<sup>th</sup> & 19<sup>th</sup>; *online posting Chapter 2*)

- Tuesday, Feb. 17<sup>th</sup>: **Chapter 3:** What does consciousness do?

*Discussion Leader:*

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- Thursday, Feb. 19<sup>th</sup>: **Chapter 4:** Attention and timing

*Discussion Leader:*

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## Week 5 (February 24<sup>th</sup> & 26<sup>th</sup>; *online posting Chapter 3*)

- Tuesday, Feb. 24<sup>th</sup>: **Chapter 5:** The theater of the mind

*Discussion Leader:*

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- Thursday, Feb. 26<sup>th</sup>: **Chapter 6:** The grand illusion

*Discussion Leader:*

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## Week 6 (March 3<sup>rd</sup> & 5<sup>th</sup>; *online posting Chapter 4*)

- Tuesday, March 3<sup>rd</sup>: **“Selected Vignettes: Psychological Phenomena”**
- Thursday, March 5<sup>th</sup>: **“Selected Topics in Computer Science”**

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

**Week 7 (March 10th & 12th; online posting Chapter 5)**

- Tuesday, March 10<sup>th</sup>: **Chapter 7:** Egos, Bundles, and Multiple Selves

*Discussion Leader:*

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- Thursday, March 12<sup>th</sup>: **Chapter 8 :** Theories of Self

*Discussion Leader:*

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**Week 8 (March 16<sup>th</sup> through March 20<sup>th</sup>)**

**S P R I N G B R E A K**

**Week 9 (March 24<sup>th</sup> & 26<sup>th</sup>; online posting Chapter 6, pgs. 106-125)**

- Tuesday, March 24<sup>th</sup>: **Chapter 9:** Agency and Free Will

*Discussion Leader:*

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- Thursday, March 26<sup>th</sup>: **“Rise of the Robots”**, Hans Moravec  
<http://www.frc.ri.cmu.edu/~hpm/project.archive/robot.papers/1999/SciAm.scan.html>

*Discussion Leader:*

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**Week 10 (March 31<sup>st</sup> & April 2<sup>nd</sup>; online posting Chapter 6, pgs. 125-150)**

- Tuesday, March 31<sup>st</sup>: \*\*\* **Cesar Chavez Day** \*\*\*

- Thursday, April 2<sup>nd</sup>: **Chapter 11:** The Function of Consciousness

*Discussion Leader:*

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**Week 11 (April 7<sup>th</sup> & 9<sup>th</sup>; online posting Chapter 6, pgs. 150-176)**

- Tuesday, April 7<sup>th</sup>: **Chapter 12:** Animal Minds

*Discussion Leader:*

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- Thursday, April 9<sup>th</sup>: **Chapter 13:** Minds and Machines

*Discussion Leader:*

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**Week 12 (April 14<sup>th</sup> & 16<sup>th</sup>; online posting Chapter 7, pgs. 177-193)**

- Tuesday, April 14<sup>th</sup>: **“Gelernter, Kurzweil Debate Machine Consciousness”**, Brooks, Kurzweil, Gelernter

<http://www.kurzweilai.net/meme/frame.html?main=memelist.html?m=4%23688>

*Discussion Leader:*

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- Thursday, April 16<sup>th</sup>: **Chapter 14: Can a Machine Be Conscious?**

*Discussion Leader:*

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**Week 13 (April 21st & 23rd; online posting Chapter 7, pgs. 193-204)**

- Tuesday, April 21<sup>st</sup>: **Chapter 15: How to Build a Conscious Machine**

*Discussion Leader:*

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- Thursday, April 23<sup>rd</sup>: **“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:*

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**Week 14 (April 28th & 30th; online posting Chapter 8, pgs. 205-217)**

- Tuesday, April 28<sup>th</sup>: **Chapter 16: The Neural Correlates of Consciousness**

*Discussion Leader:*

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- Thursday, April 30<sup>th</sup>: **Chapter 17: The Unity of Consciousness**

*Discussion Leader:*

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**Week 15 (May 5th & 7th; online posting Chapter 8, pgs. 217-235)**

- Tuesday, May 5th  
Chapter 18: Damaged Brains

*Discussion Leader:*

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- Thursday, May 7th

“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:*

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**Week 16 (May 12th & May 14th)**

- Tuesday, May 12<sup>th</sup>: **Activities, demos, synthesis**

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

- Thursday, May 14<sup>th</sup>: **Activities, demos, synthesis**

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

**Week 17 (FINAL WEEK May 18th – 22nd)**

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

**Final meeting; activity. Turn in your final paper.**

**(Tuesday May 19th; 2:00 - 3:50)**