INTRODUCTION TO COGNITIVE SCIENCE

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UCSD
What is COGNITIVE SCIENCE?
Cognitive science is:
the INTERDISCIPLINARY scientific study of mind and its processes.
How does it work?  COGNITION  What does it do?
How is information processed?

- emotion
- language
- reasoning
- memory
- perception
How is information transformed and represented?
Neuroscience  

Philosophy  

Computer science  

Linguistics  

The Mind
The Mind
Philosophy
<table>
<thead>
<tr>
<th>Theory of mind</th>
<th>Plato</th>
<th>Descartes</th>
<th>Locke</th>
<th>Hume</th>
<th>Kant</th>
<th>Leibniz</th>
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Computer science
Artificial Intelligence

- Pitts: Artificial Neural Nets
- McCulloch: Models of computation
- Turing: Turing Test
- von Neumann: Architecture
- Chomsky: Generative Grammar
- Minsky: Formal characterization of thought
Linguistics
Language

Acquisition: Innate or Learned?
Abstraction: Representation
Pragmatics: Meaning from context
Chomsky: Formal grammar
Pinker: It is all in the genes
Elman: Experience based learning
Neuroscience
Neuroscience

Learning

Memory

Perception

Behavior

Imaging

Disorders

Nature v Nurture

Representation in brain

Sensory input → perceive

Represents brain output

Visualize brain activity

Understanding of system
COGNITIVE SCIENCE IS EVERYWHERE
How do we select an appropriate action, given our goals?
Brain Computer Interface
Bionic hand

2009
Robot with rat brain.
### COURSE STRUCTURE

<table>
<thead>
<tr>
<th>Topics</th>
<th>Central to Cognitive Science</th>
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<tbody>
<tr>
<td>• Language, Mental Representation, Intentionality</td>
<td></td>
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<td>• Development, Disorders, Computational Modeling</td>
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<tr>
<th>Lectures</th>
<th>Cognitive Science Faculty</th>
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<tr>
<td>• Introduction to area of study</td>
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<tr>
<td>• Introduction to research in the department</td>
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<th>Readings</th>
<th>Online</th>
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<td>• Each lecture will have assigned reading.</td>
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<tr>
<th>Sections</th>
<th>Weeks 2-10</th>
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<td>• Quiz on previous week’s material – (lectures and readings.)</td>
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<td>• Clarify and explain material presented.</td>
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<td>• Required.</td>
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COURSE LINKS

Website
Click on “COGS1”

- http://www.cogsci.ucsd.edu/~mboyle

TED
Repository for all grades

- http://ted.ucsd.edu

Extra Credit
Experiment participation – sign-up

- SONA
Examinations
Multiple choice and short answer

- Midterm – tentatively scheduled for Thursday week 5
- Final – scheduled during finals

Quizzes
Administered in section

- No make-up quizzes
- Drop lowest quiz grade
- If needed, attend a different section (advise your TA/IA)

Extra Credit
Use SONA to sign-up

- Experiment participation 4 hours maximum