INTRODUCTION TO COGNITIVE SCIENCE

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Department of Cognitive Science
UCSD
What is COGNITIVE SCIENCE?
Cognitive science is:
the INTERDISCIPLINARY scientific study
of mind and its processes.
How is information processed?

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

Neuroscience

Philosophy

Computer science

Linguistics
The Mind
Philosophy
Plato

Descartes

Locke

Hume

Kant

Leibniz

Theory of mind

Metaphysics

Cogito ergo sum

Theory of Mind

“A Treatise of Human Nature”

“The Critique of Pure Reason”

Monads & Symbolic Thought
Computer science
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
<table>
<thead>
<tr>
<th>Neuroscience</th>
<th>Learning</th>
<th>Nature v Nurture</th>
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<tbody>
<tr>
<td></td>
<td>Memory</td>
<td>Representation in brain</td>
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<tr>
<td></td>
<td>Perception</td>
<td>Sensory input → perceive</td>
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<td></td>
<td>Behavior</td>
<td>Represents brain output</td>
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<td></td>
<td>Imaging</td>
<td>Visualize brain activity</td>
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<td></td>
<td>Disorders</td>
<td>Understanding of system</td>
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PERCEPTION * ACTION * THINKING
COGNITIVE SCIENCE IS EVERYWHERE
How do we select an appropriate action, given our goals?
Brain Computer Interface

Bionic hands? 2016
Robot with rat brain.

http://www.youtube.com/watch?v=1-0eZytv6Qk
## 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>📚 Development, Disorders, Computational Modeling</td>
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<table>
<thead>
<tr>
<th>Lectures</th>
<th>Cognitive Science Faculty</th>
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<tbody>
<tr>
<td>📺 Introduction to area of study</td>
<td>📺 Introduction to research in the department</td>
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<tr>
<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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<tbody>
<tr>
<td>📅 Quiz on previous week’s material – (lectures and readings.)</td>
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<tr>
<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

TritonED

Repository for all grades

• http://tritoned.ucsd.edu

Extra Credit

Experiment participation – sign-up

• SONA