

## **PSYC 399—The Cognitive Neuroscience of Action**

*Instructor:* Randy Flanagan, flanagan@queensu.ca, flanaganlab.com

*Office Hours:* Botterell Hall Room 227, Monday 10:00-11:00 am, Tuesday 10:00-11:00 am

### **Teaching Assistants**

Ashley Bramwell, 13acb12@queensu.ca

*Office Hours:* Monday 1:30-3:00 pm, *arrange location by email*

Valerie Murphy, vmmurphy2@gmail.com

*Office Hours:* Friday 11:30-1:00 pm, *arrange location by email*

**Class Times and Location:** Tuesday 8:30-10:00 am, Friday 10:00-11:30 am

*Location:* Ellis 327

### **Synopsis**

Although action has traditionally been viewed as the last stage of a three-part process involving first perception and then cognition, from a more modern perspective these three entities are intimately intertwined. This course will explore the links between cognition, perception and action with an emphasis on cognitive and behavioural neuroscience. Major topics that will be discussed include: action-perception coupling; planning and prediction; memory resources underlying motor learning; decision-making in action selection; action observation and mirror neurons; eye-hand coordination; and visual pathways for action versus perception.

### **Weekly Topics**

- Week 1 January 5 & 8: Organization & introduction to sensorimotor control
- Week 2 January 12 & 15: Movement planning and cost functions
- Week 3 January 19 & 22: Internal models, prediction, and sensory cancellation
- Week 4 January 26 & 29: Optimal feedback control and smart reflexes (**Dr. Scott**)
- Week 5 February 2 & 5: Motor learning
- Week 6 February 9 & 12: Eye movements and the control of behaviour (**Dr. Munoz**)
- Week 7 February 23 & 26: The mirror neuron system and action observation
- Week 8 March 1 & 4: Vision for action and perception
- Week 9 March 8 & 11: Neuroimaging in action (**Dr. Gallivan**)
- Week 10 March 15 & 18: Decision-making in action
- Week 11 March 22: Decision-making in action II
- Week 12 March 29 & April 1: Eye-hand coordination

### **Grading**

Synopses with thought questions, due each Tuesday: 20 %

In-class presentation: 20 %

Essay in area of presentation, due 2 weeks after presentation: 30 %

Essay in another area, due 2 weeks after presentation: 30 %