Introduction to Cognitive Science
COGS 100
Winter 2023

Grading Scheme

Grade Categories	Grade
Quizzes	**15%**
Online Quizzes 1, 2, and 3, equally distributed	
Assignments	**20%**
Assignment 1 Individual: Summary and mind map	10
Assignment 2 Group: Logic and cognitive modelng	10
Exams	**65%**
Midterm	25%
Final Exam 3 hours	40%

Grading Method
A *"numbers in, letters out"* method will be used. Marks will be posted as numerical percentage. The final course numerical grade will be converted to a letter grade based on Arts and Science Grading Scheme.

Late Policy
Assignments must be submitted by the posted due date. Late submissions will be accepted until the posted end date on OnQ. 1% will be subtracted from the total course mark for each day past the due date.

Accommodations
For any special accommodations, students MUST upload approved official accommodation letters on OnQ through assignment submission (details on OnQ). Without approved letters NO accommodation will be provided.

Calculator Policy
Calculators can be used during quizzes, tests and examinations which have the basic calculating functions required by most Arts and Science courses. For this purpose, the use of the **Casio 991** series calculator is permitted and is the **only approved calculator for Arts and Science students**. This calculator can be bought from the Queen's Campus Bookstore, Staples and other popular suppliers of school and office supplies.

General Information
Check the school website for standard information about the following:
(https://www.cs.queensu.ca/students/undergraduate/syllabus/year2021-22.php)

- **Turnitin Statement**
- **Academic Integrity**
- **Copyright of Course Materials**
- **Accessibility Statement**
- **Accommodations Statement and Academic Considerations for Extenuating Circumstances**
  - ***No accommodation will be given for time zone*** as students are expected to attend the classes in person.
- **Statement of the Location and Timing of Final Examinations**

Weekly Syllabus

Week 1: What is Cognitive Science and Course Overview

Topics

Unit 1 starts. Cognitive Science: A Multidisciplinary Study, Cognitive Theory, Turing Machine and Mind as a Computational Process, Related Disciplines

Readings

Textbook Chapter and additional online material.

Activities

- Introduction forum

Week 2: COGS Disciplines and Relevant Concepts from Philosophy, Psychology, Neuroscience

Topics

Unit 2 starts. Multidisciplinary Perspectives of Mind from Philosophy, Psychology, Neuroscience.

Readings

Textbook Chapter and additional online material.

Activities

- Create topic summary – definition and example for each concept definition

Week 3: COGS Disciplines and Relevant Concepts from Neuroscience, Linguistics, Anthropology

Topics

Multidisciplinary Perspectives of Mind from Neuroscience, Linguistics and Anthropology or evolution.

Readings

Textbook Chapter and additional online material.

Activities

- Consult previous final exam questions
- Assignment 1 posted

Week 4: COGS Disciplines and Relevant Concepts from Anthropology, Artificial Intelligence

Topics

Unit 2 ends. Multidisciplinary Perspectives of Mind from Anthropology or evolution, and Artificial Intelligence.

Readings

Textbook Chapter and additional online material.

Activities

- Forum post of a definition with an example
- Online Quiz 1 due

Week 5: Cognitive Processing, Modeling, and Representation of Information in the Mind – Logic, Rule

Topics

Unit 3 starts. How is information represented in the mind so that it can be processed by mental processes? What are the outcomes of the processes? Seven different mental representations to be studied. Formal logic and representations to simulate mental processing on the machine for cognitive modeling.

Readings

Textbook Chapter and additional online material.

Activities

- Attend Logic tutorial and solve logical processing using formal logic representations
- Solve example logic problems
- Complete Prolog tutorial

Week 6: Cognitive Processing and Representation of Information in the Mind – Concept and Analogy

Topics

Other mental representations to process thought and action – concepts and analogy.

Readings

Textbook Chapter and additional online material.

Activities

- Write an example of a mental process and corresponding mental representation needed by the process.
- Prepare for midterm

Week 7: Cognitive Processing and Representation of Information in the Mind – Image Network

Topics

Other mental representations to process thought and action – mental image and network.

Readings

Textbook Chapter and additional online material.

Activities

- Midterm due

Week 8: Mental Model and Mental Processes

Topics

Unit 3 ends on representations and Unit 4 starts on mental processes. Humans tend to use mental model for mental processing. Example of logic and Wason Card.

Readings

Textbook Chapter and additional online material.

Activities

- Describe your own retrospection of a mental process of recognizing a friend after 15 years.

Week 9: Memory, Vision

Topics

How is information retained in the mind and processed? How does our visual system work? How can we focus our attention efficiently?

Readings

Textbook Chapter and additional online material.

Activities

- Solve the problem of finding the fake coin or playing a computer game. What mental representation did you use? What were your thought processes? Describe.
- Online quiz 2 due

Week 10: Problem Solving and Decision Making and Social Behaviour

Topics

How do we solve problem and make decisions? How do we behave socially and why?

Readings

Textbook Chapter and additional online material.

Activities

- Assignment 2 due.

Week 11: Cognitive Modeling

Topics

Unit 5 starts. Create a computational model of the mind – simulate mental processes, logic programming and artificial neural networks

Readings

Textbook Chapter and additional online material.

Activities

- Prepare to submit Assignment 1 – create a mind map.

Week 12: Cognitive Architecture

Topics

Implementation of computational model requires programming framework or a cognitive architecture. Types of cognitive architecture and Artificial General Intelligence (AGI) – can that be a reality some day?

Readings

Textbook Chapter and additional online material.

Activities

- Online quiz 3 due
- Tutorial for final exam.
- Assignment 1 due.