



COGS 303

RESEARCH METHODS IN COGNITIVE SYSTEMS

Classes

Tuesday and Thursday, 2:00PM-3:20PM; Swing Space 105

Instructor

Ronald Rensink (CS/Psychology)
Email: rensink@psych.ubc.ca
Office: Kenny 3106 / ICICS 863
Meetings: By appointment.

Teaching Assistants

Frederic Ren / Gaby Baasch (Cognitive Systems)
Email: cogs303@gmail.com
Office: Cogs lab (Friedman building)
Meetings: By appointment

We hope to hear from you - please contact us!

Purpose

The goal of this course is to teach you how to do effective analysis and research in the areas of Cognitive Systems. It covers the skills and principles common to all forms of investigative analysis and research, and connects these to the contents of specialized courses (e.g. statistics), and ideas about the discovery of knowledge (e.g., philosophy of science). The goal is to teach you the *process* of doing science—to develop a feel for the methodologies used in various research areas, and see the ways in which they are applied. In addition, the course will connect to relevant knowledge of cognition itself, showing how the ways that we perceive and think can affect the ways that we do research.

The course also includes development of meta-skills such as critical and generative thinking, and the basics of writing and giving presentations. These are important not only in scientific research and analytic investigation of various kinds, but also in many aspects of everyday life in the real world.

Structure of Classes

This course is about teaching you skills. As such, it emphasizes “hands-on” practice, both in the assignments and in the classroom exercises.

Most classes heavily involve in-class discussion and analysis. Students will be expected to have done the readings for that day; this will be checked by a brief quiz given at the beginning of class. Students will usually be expected to hand in an essay or target article for later discussion.

General format of most classes: (times are approximate)

1. Context for the material – why it’s important (10 min)
2. Brief quiz on the readings (5 min)
3. Group analyses of material (30-40 min). Material submitted by students will be the basis for analysis. Composition of the groups (4-5 people per group): will change every section; selections will be announced in advance.
4. Exercise / discussion to help integrate the material (10-40 min).
5. Overview of assignment for next day’s class (5 min).
6. Real-world segment (remaining time). Various aspects of life in the “real world” of science: how to write, give presentations, find a suitable grad school, get a good job in research, etc. The contents of this segment will not be tested on the exams—the real test will be life itself.

Please note: You are responsible for reading assigned material *BEFORE* the class.

This material is the basis of the analyses and discussions. It is important that you read it.

Brief notes of each overview will be made available on the course website before class. *If the site becomes unavailable in the last few days before an exam, that exam will be unaffected: it will be assumed that you will have already obtained the notes long before the exam was held.*

Evaluation:

- a. **Quizzes (15%).** Brief questions about the readings covered that day; these will be asked at the beginning of most classes. Students will have 5-6 minutes to answer. Questions are straightforward, and the answers should be brief. **The mark for each quiz will be 0, 1/2, or 1.**
- b. **Submitted Material (25%).** This will be the basis for group work; it will be asked for at the beginning of most classes. One of two types of material will be requested; it will be collected from half the students (cohort A or cohort B) at any time:
 - i. **Essays (15%).** These will be ≤ 400 words each. Each student will hand in 4 of these over the term. A subset will be randomly selected each time for analysis.
Each essay will be marked (by the groups) out of 12, based on both content and style.
 - ii. **Target essays (10%).** Essays describing studies that illustrate the point of the day. These will be ≤ 400 words. Each student will do 2 of these, **including a presentation for each.**
Each target essay will be 12, 8, 4, or 0 out of 12, based on both content and style.
- c. **Analyses [groups] (15%).** Groups of 4-5 students will analyze submitted material (essays or target articles) according to the criteria discussed. *These analyses themselves will be marked.*
Only those students present during an analysis will get the mark for that analysis.
- d. **Debates [teams] (10%).** Four sessions will be held, during which teams of students will debate particular issues concerning research in Cognitive Systems. Detailed information about the form of the debates is available on the course website.
- e. **Critique of research papers (10%).** Each student will find two papers on a topic from a research area of Cognitive Systems (Computer Science, Psychology, or Linguistics) and write an essay comparing the strengths and weaknesses of each. Detailed information about the form of the critiques is available on the course website.
- f. **Mid-term exam (10%).** This will cover the contents of the readings and the notes posted online (whether or not they were discussed in class). Among other things, it will test the general skills developed up to that point—e.g., spotting assumptions, logical reasoning. *If you do better on the final exam than on the midterm, the mark of the final will be used for this.*
- g. **Final exam (15%).** This will cover the contents of the readings and the notes posted online (whether or not they were discussed in class). It will definitely test the general skills developed.

*Remember: **Don't Panic!** If the average mark is too low, grades will be scaled so that the final distribution of grades is similar to that of other third-year courses.*

Notes on Marks

1. **Debate teams.** You will be assigned to a team for the debates. Your mark will be based upon both your team's performance on the debates and your individual participation in the team. **Each team will submit a report regarding the division of labour** (e.g., that two members each did 90% of their share, and the third 120%). Details available on the course website.
2. **Analysis groups.** All members of a group will be given the same mark. However,
 - **members can be fired from a group at any time** (if majority agrees). Anyone fired will form their own group, and be expected to do the work of a regular group.
 - **if you are not present for an analysis, you won't get the mark for it.**
3. **Essays:** Late essays will not be accepted. They are needed for analysis during class.
4. **Critiques:** A critique will have its mark reduced to 85% of its current value for every 24-hour period (or part thereof) that it is late. This reduction is compounded for each day it is late. Critiques will not be accepted after the date of the final exam.
5. **Makeup exams:** THERE WILL BE **NO** MAKEUP EXAMS IN THIS COURSE. Only medical reasons (these include psychological and psychiatric ones) will be accepted for missing an exam. Should such an emergency arise before the exam, **you must contact the instructor for the course as soon as possible.** If you show up after an exam and inform us that you were sick, you will receive no credit unless you have official documentation. Students will NOT ordinarily be excused for work-, travel-, childcare- or sports-related activities.

Plagiarism and other forms of academic misconduct (e.g., cheating on exams) will not be tolerated.
*** UBC policies on these (<http://www.library.ubc.ca/home/plagiarism/>) will be enforced. ***

Online Links

Website: <http://www.cogsys.ubc.ca/303/> Wiki: <http://wiki.ubc.ca/Cogs303>

Readings

- Beveridge**, WIB (1957). *The Art of Scientific Investigation* (3rd ed.). Caldwell, NJ: Blackburn.
- HTML: <http://www.archive.org/details/artofscientifici00beve>
- Browne MN**, and **Keeley SM**. (2014). *Asking the Right Questions* (11th ed). Prentice. [B&K].
- UBC Bookstore (10th edition is also okay.)
- Heuer RJ, Jr.** (1999). *Psychology of Intelligence Analysis*.
- HTML: <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/psychology-of-intelligence-analysis/index.html>
- COGS 303 Course Materials** (2014-2015).
- UBC Bookstore.

Three quick tips for doing well in this course

1. *Attend class. If you must miss a class, talk to a classmate – get their lecture notes.*
2. Do the readings ahead of time, and read 'actively' – pay attention to what you're reading, ask yourself what point(s) the author(s) is trying to make, why this matters, and so on. Read it critically. Try to apply it to the material you'll be submitting.
3. If you're having any trouble with the course, please speak to the instructor or the TA right away.

Schedule of Classes & Readings

Any changes to this will be announced. It is recommended that readings be read in the order shown.

Date	Essay	Topic	Readings
0. BASICS			
Sep 04		Intro to the course; Mindsets	Dweck
I. EVALUATING AN ARGUMENT			
Sep 09	Essay 1-A	Belief versus knowledge	Burton; B&K, ch 1
Sep 11	Essay 1-B	Structure of arguments	B&K, ch4; Booth et al
Sep 16	-	Meanings of terms	B&K, ch5; Niederman & Boyum; Freedman
Sep 18	Debates I		
Sep 23	Essay 2-A	Assumptions	B&K, ch. 6; Heuer, pp. 65-73
Sep 25	Essay 2-B	Reasoning	Taleb; B&K, ch 7
Sep 30	-	Evidence; Recap	B&K, ch. 8, pp. 106-116
Oct 02	Debates II		
II. FINDING AN EXPLANATION			
Oct 07	Essay 3-A	Observation and mindset	Heuer, ch. 2; Beveridge, ch. 8
Oct 09	Essay 3-B	The role of hypothesis	Heuer, pp. 31-43; Beveridge, pp. 46-52
Oct 14	-	Intuition	Beveridge, ch. 6; Claxton
Oct 16	Debates III		
Oct 21	Essay 4-A	Imagination; Visualization	Beveridge, ch. 5; Brown
Oct 23	Essay 4-B	The role of chance	Gilovich; Abelson, pp. 1-11
Oct 28	-	Choosing among alternatives; Recap	Cadsby; Heuer, ch. 8
Oct 30	Debates IV		
Nov 04	MIDTERM EXAM		
III. SYSTEMATIZATION			
Nov 06	-	Experiment design	Cohen
Nov 11	<i><Remembrance Day></i>		
Nov 13	Targ 1-B	Classification; Comparative analysis	Yoon; Mayr; Kruskal & Wish
Nov 18	Targ 1-A	Hierarchies; Networks	Simon; Barabási, pp. 55-64
Nov 20	Targ 2-B	Power Laws; 80/20 Rule	Barabási, pp. 65-73, 79-92
Nov 25	Targ 2-A	Research questions	Meltzoff, pp. 13-30; Abelson, pp. 11-14
Nov 27	Critique	Presentations; Big Picture	