

Psychology 351C (A01) – Cognitive Neuroscience – Fall 2016

Course Outline

Time: Monday & Thursday, 1:00pm – 2:20pm

Room: MAC D110

Website: CourseSpaces

Instructor: Prof. Adam Krawitz

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Office Hours: TBA

Phone: 250-721-7551

Teaching Assistant: Dustin van Gerven

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Course Inspiration & Goals

"The mind is what the brain does."

Steven Pinker, p. 21, How the Mind Works, 1997.

My primary goals for this course are for you to:

Improve your knowledge of the field of cognitive neuroscience.

Develop your ability to critically read and evaluate research about the mind and brain.

Gain a deeper understanding of the methods of cognitive neuroscience.

Increase your appreciation for how cognitive neuroscience is applicable to everyday life.

Required Materials

Hardware: iClicker (Generation 1 or Generation 2)

For sale at the UVic Bookstore. Register your iClicker at: <http://www.uvic.ca/iclickerreg>

Assigned Readings: Journal articles and book chapters.

Available as PDFs on CourseSpaces: <http://coursespaces.uvic.ca/course/view.php?id=21156>

Optional Materials

Textbook: Gazzaniga, M. S., et al. (2014). *Cognitive Neuroscience: The Biology of the Mind* (Fourth Edition). New York: W. W. Norton & Company, Inc.

At UVic Bookstore and online at: <http://books.wwnorton.com/books/webad.aspx?id=4294978503>

Prerequisites & Registration

Prerequisites for this course are: PSYC 201, PSYC 210, and either PSYC 251A or PSYC 251.

Students are responsible for checking their own registration status. Students will not be added to the course after the Add Deadline on September 23. Students may not be automatically dropped for non-attendance, so students deciding to drop the course must do so themselves. The Drop Deadline with 100% fee reduction is September 20, with 50% fee reduction is October 11, and without penalty of failure is October 31. Refer to the UVic Calendar for further dates: <http://web.uvic.ca/calendar/general/dates.html>

Course Experience Survey (CES)

Near the end of the term, you will receive an email inviting you to complete the CES online. **Please wait and complete the CES in class on Thursday, December 1.** I will set aside ~15 minutes at the beginning of class. We do the CES in class because this increases the number of students who complete it. You will need your UVic Netlink ID and a laptop, tablet, or mobile device. If you do not own one then please try to borrow one for that class. If you don't complete the CES during class, you can complete it at any time during the last week of classes.

I value your feedback on this course! The more students that complete the survey, the more meaningful and informative the results will be. The CES provides vital information that I will use to improve this course in the future. It will also be used by the Department of Psychology to evaluate my performance as an instructor. I will not receive the results until after I have submitted marks for this course. Responses are anonymous unless you choose to say things in optional open-ended comments that identify you.

Students are expected to familiarize themselves with the Important Course Policy Information (attached).

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Evaluation

Your grade will be based on the following items:

<u>Item</u>	<u>Date</u>	<u>% of Grade</u>	
iClicker Participation	throughout	4	} = 100%
Homework Assignments	throughout	21	
Exam 1	Mon., Oct. 3	25	
Exam 2	Mon., Oct. 31	25	
Exam 3	(Exam Period)	25	
Extra Credit	by Fri., Dec. 2	(up to 2)	

iClicker Participation (4%): The use of iClickers in the classroom will give you opportunities to participate in class, compare your thoughts with those of other students, and provide me with feedback on your level of understanding. **You will not be evaluated on the answers you give, just on participation.**

iClicker participation credit for a class is earned by making at least one iClicker response that day. Credit will be given for each class, except for the first class and exam days, thus there are 20 available classes. You can miss iClicker participation in up to 4 classes and still receive full credit. If you miss participation in more than 4 classes, your grade will be based on the number of days you participated divided by 16.

Homework Assignments (21%): For each topic, a homework assignment will give you hands-on experience and active engagement with the material. Credit will be divided evenly over the 7 assignments. Detailed instructions on how to access and complete the assignments will be provided on CourseSpaces.

Exams (75%): Exams will evaluate your understanding of the material presented in the assigned articles, the lectures, and the homework assignments. Exams may include multiple choice, short answer, and essay questions on the following topics:

Exam 1: TMS & Perception, ERPs & Attention

Exam 2: Single-Unit Recording & Action, Neural Networks & Cognitive Control

Exam 3: fMRI & Long-Term Memory, Lesions & Language, Converging Methods & Decision Making

The first 2 exams will be in class, while Exam 3 will be during the examination period. You are responsible for attending examinations as scheduled. This responsibility includes Exam 3, so **DO NOT plan your travel until the exam schedule is finalized.** If you miss Exam 1 or 2 for a valid, documented reason (e.g. illness or accident) you may be permitted to write a make-up test at the instructor's discretion. Unexcused missed examinations will be assigned a score of zero. If you miss Exam 3, you must apply to Records Services to request a deferred examination (see the UVic Calendar for guidelines).

Extra Credit (up to 2%):

Research Participation: Experience research being carried out here at UVic, while simultaneously helping out our scientific community with data collection. Earn up to 2% toward your final grade by participating in research studies in the Department of Psychology. Each 15 minutes of participation will earn 0.5 credits and **up to 4 credits** may be counted toward this course. Each credit increases your final grade by 0.5%, thus 2 hours (i.e. 4 credits) of participation will earn the full 2%. For details, go to the Psychology Research Participation System web page (<http://www.uvic.ca/socialsciences/psychology/research/participants>) and follow the instructions for students. You are encouraged, but not required, to participate in studies pertaining to this class. The last day for earning and assigning credits towards this course is **Friday, December 2.**

Alternative Activity (article reviews): If you want to earn extra credit, but do not wish to be a research participant, article reviews are an alternative. You will gain research experience by writing reviews of recent journal articles about original research relevant to the course. Each review will be worth 1% extra credit and a maximum of 2 reviews will be accepted (i.e. you can earn a total of 2% extra credit). You must send an email to the TA no later than **the start of class on Thursday, Nov. 17** indicating you wish to use this option, and submitting the chosen journal article(s) for approval. Completed reviews must be submitted in printed form no later than **Friday, Dec. 2.** Details and requirements are on CourseSpaces.

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Grades

Your final letter grade in the course will be determined by your total percent score according to the standard UVic grading scale (see the UVic Calendar for details). Final grades with a decimal point of 0.5 or above will be rounded to the next higher whole number, and grades with a decimal point below 0.5 will be rounded to the next lower whole number. The minimum percentage necessary for each grade is as follows:

Letter grade:	A+	A	A-	B+	B	B-	C+	C	D
Minimum %:	90	85	80	77	73	70	65	60	50

Tips for Success

Please consider the following suggestions for maximizing success:

Attend, participate, and engage in **class**.

Use the posted **lecture slides** for note-taking, reference, and studying.

Read the **assigned articles and chapters** to augment the lecture material.

Do the **homework assignments**, and make sure you understand how to arrive at the correct answers.

When you are studying, don't just reread, actively **self-test**.

Focus not just on facts, but also on **concepts, methods**, and logical arguments.

Don't cram, rather, spread out your study time over days and weeks.

Organize a **study group** using the Student Discussion Forum on CourseSpaces.

If you struggle in the course, **seek help sooner rather than later** – we want you to succeed!

Sources of Assistance

Please make use of the following resources as needed:

Course Material: Do you have questions about course material? Or do you just want to chat about the course? Please feel free to contact Prof. Krawitz or the TA during office hours or by email.

Course Marks: Do you have questions about the marking of an exam or lab activity? First, review the course material, including the answer key (if applicable), to determine the explanation yourself. Second, if you still have questions, visit the TA during office hours. Third, if talking to the TA does not resolve the issue, visit Prof. Krawitz during office hours.

iClicker: If you have not received any iClicker participation points, and you believe you should have, first make sure that you have registered your iClicker at UVic: <http://www.uvic.ca/iclickerreg>

For general iClicker technical support, refer here:

<http://www.uvic.ca/systems/support/learningteaching/iclicker/>

CourseSpaces, Email, Netlink ID, Lab Computers: For technical matters, please contact the Computer Help Desk: helpdesk@uvic.ca, (250) 721-7687, Clearihue A004, or visit the University Systems Help Centre:

<http://www.uvic.ca/systems/support/>

Psychology Research Participation System: Email the coordinator: p100res@uvic.ca, or refer to the documentation at: <http://www.uvic.ca/socialsciences/psychology/research/participants/>

Academic Accommodation: Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodation, please feel free to approach me and/or the Resource Centre for Students with a Disability (RCSD) as soon as possible. The RCSD staff members are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations: <http://rcsd.uvic.ca/>

English as an Additional Language: If English is not your first language and you are having trouble because of that, please contact the English Language Centre: <http://www.uvcs.uvic.ca/elc/>

Mental Health and Well-being: Most students at one time or another struggle with mental health issues (anxiety, depression, insomnia, substance abuse, etc.). UVic has a wealth of resources to help students through those tough times: <http://www.uvic.ca/mentalhealth/students/>

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Course Readings

- Bechtel, W. (2002). Aligning multiple research techniques in cognitive neuroscience: Why is it important? *Philosophy of Science*, 69(53), 548–558. <http://doi.org/10.1086/341767>
- Botvinick, M. M., & Cohen, J. D. (2014). The computational and neural basis of cognitive control: Charted territory and new frontiers. *Cognitive Science*, 38(6), 1249–1285. <http://doi.org/10.1111/cogs.12126>
- Braver, T. S., Barch, D. M., & Cohen, J. D. (1999). Cognition and control in schizophrenia: A computational model of dopamine and prefrontal function. *Biological Psychiatry*, 46(3), 312–28. [http://doi.org/10.1016/S0006-3223\(99\)00116-X](http://doi.org/10.1016/S0006-3223(99)00116-X)
- Buzsáki, G. (2004). Large-scale recording of neuronal ensembles. *Nature Neuroscience*, 7(5), 446–51. <http://doi.org/10.1038/nn1233>
- Cabeza, R., Rao, S. M., Wagner, A. D., Mayer, A. R., & Schacter, D. L. (2001). Can medial temporal lobe regions distinguish true from false? An event-related functional MRI study of veridical and illusory recognition memory. *Proceedings of the National Academy of Sciences of the United States of America*, 98(8), 4805–10. <http://doi.org/10.1073/pnas.081082698>
- Dronkers, N. F. (1996). A new brain region for coordinating speech articulation. *Nature*, 384(6605), 159–161. <http://doi.org/10.1038/384159a0>
- Georgopoulos, A. P. (1994). New concepts in generation of movement. *Neuron*, 13(2), 257–268. [http://doi.org/10.1016/0896-6273\(94\)90345-X](http://doi.org/10.1016/0896-6273(94)90345-X)
- Georgopoulos, A. P., Lurito, J. T., Petrides, M., Schwartz, a B., & Massey, J. T. (1989). Mental rotation of the neuronal population vector. *Science*, 243(4888), 234–236. <http://doi.org/10.1126/science.2911737>
- Hallett, M. (2007). Transcranial magnetic stimulation: A primer. *Neuron*, 55(2), 187–99. <http://doi.org/10.1016/j.neuron.2007.06.026>
- Henson, R. (2005). A mini-review of fMRI studies of human medial temporal lobe activity associated with recognition memory. *The Quarterly Journal of Experimental Psychology. B, Comparative and Physiological Psychology*, 58(3-4), 340–60. <http://doi.org/10.1080/02724990444000113>
- Hillis, A. E. (2007). Aphasia: Progress in the last quarter of a century. *Neurology*, 69(2), 200–213. <http://doi.org/10.1212/01.wnl.0000265600.69385.6f>
- Hinton, G. E. (1992). How neural networks learn from experience. *Scientific American*. <http://doi.org/10.1038/scientificamerican0992-144>
- Knoch, D., Gianotti, L. R. R., Pascual-Leone, A., Treyer, V., Regard, M., Hohmann, M., & Brugger, P. (2006). Disruption of right prefrontal cortex by low-frequency repetitive transcranial magnetic stimulation induces risk-taking behavior. *Journal of Neuroscience*, 26(24), 6469–6472. <http://doi.org/10.1523/JNEUROSCI.0804-06.2006>
- Luck, S. J. (2012). Event-related potentials. *APA Handbook of Research Methods in Psychology, Vol. 1: Foundations, Planning, Measures, and Psychometrics*, 1, 523–546. <http://doi.org/10.1037/13619-028>
- Luck, S. J., Vogel, E. K., & Shapiro, K. L. (1996). Word meanings can be accessed but not reported during the attentional blink. *Nature*, 383(6601), 616–8. <http://doi.org/10.1038/383616a0>
- Luck, S. J., Woodman, G. F., & Vogel, E. K. (2000). Event-related potential studies of attention. *Trends in Cognitive Sciences*, 4(11), 432–440. [http://doi.org/10.1016/S1364-6613\(00\)01545-X](http://doi.org/10.1016/S1364-6613(00)01545-X)
- Pascual-Leone, A., & Walsh, V. (2001). Fast backprojections from the motion to the primary visual area necessary for visual awareness. *Science*, 292(5516), 510–2. <http://doi.org/10.1126/science.1057099>
- Platt, M. L., & Huettel, S. A. (2008). Risky business: The neuroeconomics of decision making under uncertainty. *Nature Neuroscience*, 11(4), 398–403. <http://doi.org/10.1038/nn2062>
- Posner, M. I., & DiGirolamo, G. J. (2000). Cognitive neuroscience: Origins and promise. *Psychological Bulletin*, 126(6), 873–89. <http://doi.org/10.1037/0033-2909.126.6.873>
- Rorden, C., & Karnath, H.-O. (2004). Using human brain lesions to infer function: A relic from a past era in the fMRI age? *Nature Reviews. Neuroscience*, 5(10), 813–9. <http://doi.org/10.1038/nrn1521>
- Walsh, V., & Cowey, A. (1998). Magnetic stimulation studies of visual cognition. *Trends in Cognitive Sciences*, 2(3), 103–110. [http://doi.org/10.1016/S1364-6613\(98\)01134-6](http://doi.org/10.1016/S1364-6613(98)01134-6)
- Wittmann, B. C., & D'Esposito, M. (2012). Functional magnetic resonance imaging. *APA Handbook of Research Methods in Psychology, Vol. 1: Foundations, Planning, Measures, and Psychometrics.*, 1, 547–566. <http://doi.org/10.1037/13619-029>

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Course Schedule

<u>Topic</u>	<u>Date</u>	<u>Reading</u>	<u>Optional Textbook Reading</u>
0. Course Introduction			Ch. 1
	Thu., Sep. 8	Posner & DiGirolamo (2000)	
1. TMS & Perception			Ch. 3 (pp. 88-89) & Ch. 5
	Mon., Sep. 12	Hallett (2007)	
	Thu., Sep. 15	Walsh & Cowey (1998)	
	Mon., Sep. 19	Pascual-Leone & Walsh (2001)	
2. ERPs & Attention			Ch. 3 (pp. 98-102) & Ch. 7
	Thu., Sep. 22	Luck (2012)	
	Mon., Sep. 26	Luck, Woodman, & Vogel (2000)	
	Thu., Sep. 29	Luck, Vogel, & Shapiro (1996)	
Exam 1	Mon., Oct. 3	(Topics 1 & 2)	
3. Single-Unit Recording & Action			Ch. 3 (pp. 95-98) & Ch. 8
	Thu., Oct. 6	Buzsáki (2004)	
	(Mon., Oct. 10)	<i>Thanksgiving Day – No Class</i>	
	Thu., Oct. 13	Georgopoulos (1994)	
	Mon., Oct. 17	Georgopoulos et al. (1989)	
4. Neural Networks & Cognitive Control			Ch. 3 (pp. 111-114) & Ch. 12
	Thu., Oct. 20	Hinton (1992)	
	Mon., Oct. 24	Botvinick & Cohen (2014)	
	Thu., Oct. 27	Braver, Barch, & Cohen (1999)	
Exam 2	Mon., Oct. 31	(Topics 3 & 4)	
5. fMRI & Long-Term Memory			Ch. 3 (pp. 107–110) & Ch. 9
	Thu., Nov. 3	Wittmann & D'Esposito (2012)	
	Mon., Nov. 7	Henson (2005)	
	(Thu., Nov. 10)	<i>Reading Break – No Class</i>	
	Mon., Nov. 14	Cabeza et al. (2001)	
6. Lesions & Language			Ch. 3 (pp. 78-86) & Ch. 11
	Thu., Nov. 17	Rorden & Karnath (2004)	
	Mon., Nov. 21	Hillis (2007)	
	Thu., Nov. 24	Dronkers (1996)	
7. Converging Methods & Decision Making			Ch. 3 (pp. 114-117) & Ch. 12
	Mon., Nov. 28	Bechtel (2002)	
	Thu., Dec. 1	Platt & Huettel (2008) & Knoch et al. (2006)	
Exam 3	Exam Period	(Topics 5, 6, & 7)	

UNIVERSITY OF VICTORIA
Department of Psychology

Important Course Policy Information
Winter 2016-2017

Prerequisites

Students who remain in courses for which they do not have the prerequisites do so at their own risk. Students who complete courses without prerequisites ARE NOT exempt from having to complete the prerequisite course(s) if such courses are required for the degree program.

Program Requirements

For more information see pages 383-386 of the UVic Calendar 2016-17.

Registration Status

Students are responsible for verifying their registration status. Registration status may be verified using My Page, View Schedule. Course adds and drops will not be processed after the deadlines set out in the current UVic Calendar.

Commitment to Inclusivity and Diversity

The University of Victoria is committed to promoting, providing and protecting a positive and supportive and safe learning and working environment for all its members.

In the Event of Illness, Accident or Family Affliction (See UVic Calendar, 2016-17, p. 59-60)

• ***What to do if you miss an exam other than one scheduled during the formal examination period***

Do not apply at Records Services for a "Request for Academic Concession". Instead submit documentation of the illness, accident or family affliction directly to your course instructor (or designated teaching assistant).

• ***What to do if you miss an exam scheduled during the formal exam period***

Apply at Records Services for a "Request for Academic Concession", normally within 10 working days of the end of the formal examination period. Records Services will forward the form to the instructor. If the concession is granted the instructor will determine how to deal with the situation (for example, a deferred exam). Where a concession is not applied for or where such application is denied, an N grade will be entered on the student's academic record.

OR, you can download the Request for Academic Concession form here:

<http://www.uvic.ca/registrar/assets/docs/record-forms/rac.pdf>

• ***What to do if you require additional time to complete course requirements***

Apply at Records Services for a "Request for Academic Concession", normally within 10 working days of the end of the formal examination period. Records Services will forward the form to the instructor. If the concession is granted the instructor will determine how to deal with the situation. Where a concession is not applied for or where such application is denied, an N grade will be entered on the student's academic record.

OR, you can download the Request for Academic Concession form here:

<http://www.uvic.ca/registrar/assets/docs/record-forms/rac.pdf>

Policy on Academic Integrity including Plagiarism and Cheating

The Department of Psychology fully endorses and intends to enforce rigorously the Senate Policy on Academic integrity (<http://web.uvic.ca/calendar2016-09/undergrad/info/regulations/academic-integrity.html> , p. 55-58, UVic Calendar 2016-17). It is of utmost importance that students who do their work honestly be protected from those who do not. Because this policy is in place to ensure that students carry out and benefit from the learning activities assigned in each course, it is expected that students will cooperate in its implementation.

The offences defined by the policy can be summarized briefly as follows:

1. **Plagiarism.** You must make sure that the work you submit is your work and not someone else's. There are proper procedures for citing the works of others. The student is responsible for being aware of and using these procedures.
2. **Multiple Submission.** Only under exceptional circumstances may a work submitted to fulfill an academic requirement be used to satisfy another similar requirement. The student is responsible for clarifying this with the instructor(s) involved.
3. **Falsifying Materials Subject to Academic Evaluation.** This includes falsification of data, use of commercially prepared essays, using information from the Internet without proper citation, citing sources from which material is not actually obtained, etc.
4. **Cheating on Assignments, Tests, and Examinations.** You may not copy the work of others in or out of class; you may not give your work to others for the purpose of copying; you may not use unauthorized material or equipment during examinations or tests; and you may not impersonate or allow yourself to be impersonated by another at an examination. The Department of Psychology has a policy of not making old examinations available for study purposes. Therefore, use of old exams without the express written permission of the instructor constitutes cheating by the user, and abetting of cheating by the person who provided the exam.
5. **Being an Accessory to Offences.** This means that helping another student to cheat (for instance, by showing or communicating to them answers to an assignment, or by allowing them to view answers on an exam) is an academic offence.

Instructors are expected to make every effort to prevent cheating and plagiarism. This may include the assignment of seating for examinations, asking students to move during examinations, requests to see student identification cards, and other measures as appropriate. Instructors also have available to them a variety of tools and procedures to check for Internet and electronic media-based cheating. In instances of suspected or actual plagiarism or cheating, instructors, following prescribed procedures, are authorized to take steps consistent with the degree of the offence. These measures will range from a zero on the test or assignment or a failing grade for the course, probation within a program to temporary or even permanent suspension from the University.

Rights of Appeal are described in the Policy on Academic Integrity in the University calendar (on p. 55-58 in 2016-17).

The definitive source for information on Academic Integrity is the University Calendar (p. 55-58 in 2016-17) (<http://web.uvic.ca/calendar2016-09/undergrad/info/regulations/academic-integrity.html>)

Other useful resources on Plagiarism and Cheating include:

1. The Learning Skills program: <http://www.coun.uvic.ca/learning/index.html>
2. The Ombudsperson's office: <http://www.uvss.uvic.ca/ombudsperson/pubsguides/plagiarism.pdf>