

## PSY 380H1 Winter 2025 – Vision Science

Mondays, 2 – 5 pm, University College, room 87

### Contact Information

<b>Instructor:</b> Dirk Bernhardt-Walther	<b>Teaching Assistant:</b> Leo Huang
<b>Preferred communication:</b> Message in Quercus <b>Email:</b> <a href="mailto:dirk.bernhardt.walther@utoronto.ca">dirk.bernhardt.walther@utoronto.ca</a>	<b>Preferred communication:</b> Message in Quercus
<b>Office Hours:</b> To be announced	

### Course Description, Goals, and Prerequisites

Can we believe what we see with our own eyes? Throughout this course you will learn that the answer to this question is in fact ‘only up to a point’. We are constantly deceived. Why? We approach this question from a psychological, computational, and neuroscience viewpoint. You will come to learn that there is not a direct relationship from eye to brain, but what we see can be influenced by what we have learned to see. You will see to what extent biological principles of vision translate to computer science, and to what extent computer vision is approaching the same vision problems differently from the human brain.

The course will include in-class demonstrations and experiments. You will learn how to structure a scientific paper and write a paper about the in-class experiment. The course has a strong writing component.

#### Goals:

Upon successful completion of this course, students:

1. Have foundational knowledge of seminal papers in vision science,
2. Understand psychological, physiological and computational approaches and methods in vision science.
3. Are able to critically answer questions about vision science by referring to existing literature.

**Prerequisites:** PSY201H1 or a more advanced class on statistics; PSY280H1 or a class on computer vision or PSY270H1 or PSY290H1 or COG250H1 or COG341H1 or equivalent.

## Reading Material

There is no textbook for this class. Required reading of journal articles will be posted on the Quercus class site.

### Lecture slides:

I will post slides for the lectures on Quercus. I cannot promise that this will always happen well ahead of the class.

## Course Evaluation

The class will be evaluated with the following assessments:

Evaluation type	Points	Date
Packback discussion forum	150 (15%)	Throughout class
3 Quizzes, 150 points each	450 (45%)	In weeks 4, 7, and 10
Final Exam	400 (40%)	During Finals Period

**In total, students can earn up to 1000 points.**

### (i) Packback

Participation in the online discussion is a requirement for this course, and the Packback Questions platform will be used for online discussion about class topics. Packback Questions is an online community where you can be fearlessly curious and ask open-ended questions to build on top of what we are covering in class and relate topics to real-world applications.

#### *Packback Requirements:*

The deadline for submitting **questions** on Packback is **Sunday night**, before each class.

**Responses** are due by **Friday night**, after the class.

In order to receive full credit, you should submit the following each week:

- 1 open-ended Question with a minimum Curiosity Score of 70, worth 5 points
- 2 Responses with a minimum Curiosity Score of 70, worth 5 points each
- Half credit will be provided for questions and responses that do not meet the minimum curiosity score.

Details for setting up your Packback account will be provided on Quercus.

Packback questions and responses have to be submitted by the respective deadline. **Late submissions are not accepted** for the Packback discussions.

## (ii) Quizzes

Three quizzes will be written in class. The quizzes will test the material of the preceding three classes in a format that will be similar to the Final Exam. Details will be announced in class and on Quercus. Each quiz is worth 150 points.

## (iii) Final Exam

A final exam covering the material from the entire class will be written during Final Examination Period. It will consist of short- and long-answer questions. The exam will be based on material presented in class and the content of the papers assigned for the classes. The final exam is worth 400 points (40%).

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### Course Webpage

The Quercus website associated with this course is accessible via <http://q.utoronto.ca>.

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### Grading Policy

I strictly follow the official U of T grading scheme:

<http://www.writing.utoronto.ca/advice/general/grading-policy>

I do not round grades. That is, you actually have to achieve 80% to get an A-, for instance. 79.9% is not enough. There has to be a cut-off somewhere, and the U of T grading scheme provides cut-offs explicitly for the individual grades. If I were to round grades, then the cut-off for an A- would be at 79.5%, which is just as arbitrary as 80%.

### Re-grade Requests

The TA and I work very hard to grade assignments fairly and thoughtfully. Please wait at least 24-36 hours before reaching out to us. If you believe an assignment has received a grade in error, you may submit an appeal. An appeal must be submitted within 14 days after the graded assignment is made available to students. Documents submitted for an appeal will be re-graded in their entirety. As a result, your grade may increase, but it may also stay the same or even decrease.

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### Course Policies

#### Missed Quizzes

If you need to miss one of the quizzes due to illness or other life events, then please make sure to submit documentation to the instructor **within one week of the quiz**. Three forms of verification are acceptable:

1. The Verification of Student Illness or Injury form: <https://registrar.utoronto.ca/policies-and-guidelines/verification-of-illness-or-injury/>

The form must show that the physician was consulted **within one the day of the missed**

**quiz.**

2. Declare an absence on ACORN. For details see:  
<https://www.artsci.utoronto.ca/current/academics/student-absences>
3. Ask your college registrar to contact the instructor with an explanation of the circumstances and recommended accommodations.

Students who miss the **final exam** should file a petition for a deferred exam with their College Registrar's Office.

### **Use of Generative AI**

Artificial Intelligence (AI) can be a useful tool for processing information and for composition. The Packback Discussion Forum features an AI assistant that will guide you toward writing good discussion contributions. You may also find AI tools useful for summarizing papers that you are assigned to read. Note, however, that you are responsible for knowing how to access the details directly from the papers.

The quizzes and the final exam will be written in person and on paper. No electronic devices are permitted.

### **Written Communication Policy**

Please check the syllabus and the class materials posted on Quercus before sending a message on Quercus or an email. You will find answers to most of your questions there. If you cannot find the answer there, then please post your question to the general class discussion on Quercus. It is likely that some of your classmates have the same question. By posting on the class discussion, they will be able to see your question as well as my answer.

I am available to answer questions about lecture material in the online forum as well as through Zoom during office hours. Please address any questions about grading and assessment to the TA. The preferred form of communication for the TAs and the instructor is direct messaging on Quercus.

Finally, please **consider all class communications as professional correspondence**. Proofread your message for spelling and grammar. Do not use short-hands and abbreviations – We are not your Facebook/Snapchat/WhatsApp buddies. **Remember, emails and posts on Quercus last forever and cannot be unsent.**

### **Religious Accommodation**

As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of backgrounds, cultural traditions, and spiritual beliefs. For my part, I will make every reasonable effort to avoid scheduling compulsory activities on religious holy days not captured by statutory holidays. Further to

University Policy, if you anticipate being absent from class or missing a major course activity (like a test, or in-class assignment) due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

### **Special Medical Circumstances**

If you become ill and it affects your ability to do your academic work, consult me right away. Normally, I will ask you for documentation in support of your specific medical circumstances. This documentation can be an Absence Declaration (via ACORN) or the University's Verification of Student Illness or Injury (VOI) form. The VOI indicates the impact and severity of the illness, while protecting your privacy about the details of the nature of the illness. If you cannot submit a VOI due to limits on terms of use, you can submit a different form (like a letter from a doctor), as long as it is an original document, and it contains the same information as the VOI (including dates, academic impact, practitioner's signature, phone and registration number). For more information on the VOI, please see:

<http://www.illnessverification.utoronto.ca>

For information on Absence Declaration Tool for A&S students, please see:

<https://www.artsci.utoronto.ca/absence>

If you get a concussion, break your hand, or suffer some other acute injury, you should register with Accessibility Services as soon as possible.

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## **Academic Resources**

### **Departmental Guidance for Undergraduate Students in Psychology**

The Department of Psychology recognizes that, as a student, you may experience disruptions to your learning that are out of your control, and that there may be circumstances when you need extra support. Accordingly, the department has provided a [helpful guide](#) to clarify your and your instructor's responsibilities when navigating these situations. This guide consolidates Arts & Science Policies for undergraduate students in one place for your convenience. As an instructor in the department, I will frequently consult with these recommendations when providing you with support, and I recommend that you also consult it to learn more about your rights and responsibilities before reaching out to me.

### **Accessibility Needs:**

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or Accessibility Services at (416) 978 8060; [accessibility.utoronto.ca](http://accessibility.utoronto.ca).

**Writing:**

As a student here at the University of Toronto, you are expected to write well. The university provides its students with a number of resources to help them achieve this. For more information on campus writing centres and writing courses, please visit

<http://www.writing.utoronto.ca/>.

If English is not your first language, you may want to consider the English Language Learning program of the Faculty of Arts and Science:

<http://www.artsci.utoronto.ca/current/advising/ell>

**Academic Integrity and Plagiarism:**

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters the behaviours that constitute academic dishonesty and the processes for addressing academic offences.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources.

For the University of Toronto's Code of Behaviour on Academic Matters see:

<https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019>

**Other Resources**

Student Life Programs and Services (<http://www.studentlife.utoronto.ca/>)

Academic Success Services (<http://www.asc.utoronto.ca/>)

Counselling and Psychological Services (<http://www.caps.utoronto.ca/main.htm>)

## Course Outline

This outline is preliminary and subject to change.

Week	Date	Topic	Assessment
1	Jan. 6 <sup>th</sup>	Introduction, History, and Philosophy of Vision Science	
2	Jan. 13 <sup>th</sup>	Low-level Vision	
3	Jan. 20 <sup>th</sup>	Motion Perception	
4	Jan. 27 <sup>th</sup>	Depth Perception	Quiz 1: weeks 1-3
5	Feb. 3 <sup>rd</sup>	Color Vision	
6	Feb 10 <sup>th</sup>	Mid-level Vision	
	Feb 17 <sup>th</sup>	<i>Family Day – no class</i>	
7	Feb 24 <sup>th</sup>	Object Recognition	Quiz 2: weeks 4-6
8	March 3 <sup>rd</sup>	Scene Perception	
9	March 10 <sup>th</sup>	Neural Network Models	
10	March 17 <sup>th</sup>	Multisensory Integration	
11	March 24 <sup>th</sup>	Visual Attention	Quiz 3: weeks 7-9
12	March 31 <sup>st</sup>	Aesthetics / Consciousness	
	TBD	Final Exam covering material from weeks 1-12.	