

## **Current Topics in Perception: Multisensory Integration**

### **I) Course information**

Course number: PSYD51H3

Thursdays, 4-6 pm

Room: HL 006

Prerequisites: PSYB51, [0.5 credit from the PSYC50-series of courses] or NROC64H3

### **II) Instructor:**

Dr. Matthias Niemeier\

1265 Military Trail

SW550\

phone: 416-287-7466\

e-mail: niemeier@utsc.utoronto.ca\

Office Hours: Wednesdays 2PM

Also, I will have special office hours for everyone to help with preparations for their presentation in class. I request to please approach me about this at least one week before your presentation.

### **III) Course coverage and goals**

The world around us is multimodal. How do we join our senses (vision, audition, touch, olfaction, balance etc.) together to obtain a coherent percept of the world? In the past few years, multisensory integration has become a topic of major research interest. The course provides a survey of the recent developments. Selected readings will cover neurophysiological results, psychological and neuropsychological findings, synaesthesia, and an introduction to the Bayesian mechanisms of multisensory integration.

On a more general level PSYD51 is modeled after seminar courses in grad school as well as lab meetings in research labs. As such PSYD51 provides training in reading and understanding scientific articles, oral and written scientific communication, critical thinking, and grant writing.

### **IV) Course Web Site: Quercus**

Here you will find the syllabus, instructions for the papers, the most up-to-date version of the lecture schedule, and announcements.

Please check on a regular basis for announcements.

### **V) Evaluation**

One aim of this course is to be closer to the real world of science than that is possible in a lecture. That is, there won't be exams nor a textbook. There won't even be a regular lecture. Instead, your presence in class and **active** participation in the course is expected and will be a significant part of the grade. We will have a reading list of original research papers (2 per week), and every week there will be presentations and discussions on them. Also, we will have

assignments; every week a short thought paper on one of the research papers from the reading list, and at the end of the course there will be a research proposal on a topic of multisensory integration.

**30% Presentation.** On one day you are asked to present one of the research papers for the respective day. The quality of your presentation will be crucial for your own and for everyone else's learning experience. You can earn these 30% within 20- 25 min, which is the length of your presentation. To be successful it needs to be a free presentation. You can use notes, but reading from a manuscript just doesn't work for your audience. The exact structure of the presentations will vary from article to article. But it should have the following parts:

- (a) a brief introduction to the topic (up to 5 min)
- (b) a summary of the methods, results and conclusions of the paper. (~15 min)
- (c) a summary of the discussion of the article (up to 5min)

A group discussion will follow your presentation (not part of your grade). To choose a topic, please refer to the Schedule and the reading list. Topics will be assigned on a first-come-first-serve basis. Please email me your first 3 choices. Please contact me to set up a 1-hr appointment with me to prepare for your presentation.

**30% Active participation in the group discussions.** Every week you are expected to read the respective literature (2 papers) so that you are properly prepared to engage in discussions on them. The 30% emphasize that I value participation very much. Science lives from discussions. For this seminar it means that you need to say something in class that pertains to the respective topic. No worries, you don't need to make genius comments in class (but it doesn't hurt, of course). It is perfectly fine to convey any kind of thought of your own. For example: Do you agree with the authors? Do you have concerns about confounds or gaps in the study? Or maybe, were you impressed with something about the study? Do you have ideas about how to extend the research? Anything from your thought paper (see below) that you might want to share? Even if there was something in the paper that you didn't understand that could be worth talking about. There is a good chance that others had the same problem (but you get the credit for bringing it up). – Our discussions can be about many different things, and you will get a point for every session during which you contribute to those discussions. Speaking of "every session". Part of participating implies that you are present. Every week. That's the hitch of having no exams and no textbook. For more than one missed session I will need to factor this in, unless I receive medical certificates from you.

**20% Five thought papers (4% each).** Having read the weekly literature (2 papers) you also need to write thought papers about some of these articles. That means 2 double-spaced pages of your own thoughts. The purpose is (a) to encourage you to read the literature carefully and to prepare for the respective session of course (e.g., you may write a paper about a great idea and bring that

same idea up during class), (b) to practice scientific writing, (c) to encourage you to develop your own thoughts on the particular topic. Thought papers need to be submitted for the respective session during which the respective article is being discussed (email submission before the start of the class; a deduction of 10% per every 24h of late submission). Please note that thought papers need to be structured in a specific way, see instructions on **Quercus** (“**How to write a thought paper**”).

Also, we cannot have all thought papers submitted towards the end of the course because I could not offer you timely feedback; what is worse, quite a few people would be unable to complete their work. Therefore, please submit thought papers according to the following schedule:

- - Thought paper 1: session 2, 3, or 4
- - Thought paper 2: session 5 or 6
- - Thought paper 3: session 7 or 8
- - Thought paper 4: session 9 or 10
- - Thought paper 5: session 11 or 12

You can make up for grades for up to 2 thought papers, on the condition that the make-up paper is submitted during the same time period. That is, if you submit a paper for session 7 and another paper for session 8, then I will take the better of the two grades to count as your “thought paper 3 grade.” However, a grade for a paper submitted for session 9 can only count as paper 4 grade, it cannot count as paper 3 grade.

**20% Research proposal.** The proposal is due on the last day of classes. Please go to BlackBoard for tips and instructions on “**How to write a research proposal**”.

### VI) Schedule

The schedule is subject to changes as we go along. The most up-to-date version will be on the Intranet.

Week	Topic	Literature
1	Introduction	--
2	Neural mechanisms of multisensory integration	<a href="#">Hummel &amp; Gerloff (2005)</a> , <a href="#">Bremmer et al. (2001)</a>
3	Crossmodal cueing of attention	<a href="#">Spence &amp; Driver (1997)</a> <a href="#">Ward et al. (2000)</a>
4	Multisensory object perception: behaviour	<a href="#">Newell et al. (2001)</a> , <a href="#">Lacey et al. (2007)</a>
5	Multisensory object perception: fMRI	<a href="#">Amedi et al. (2001)</a> <a href="#">Amedi et al. (2007)</a>

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6	Optimal multisensory integration: psychophysics and models	--- <i>Introduction to Maximum Likelihood Estimation</i> --- <a href="#">Ernst &amp; Banks (2002)</a> <a href="#">Deneve et al. (2001)</a>
7	Vision and sound in space	-- <a href="#">Alais &amp; Burr (2004)</a> , <a href="#">Fujisaki et al. (2004)</a>
8	Vision and sound / touch in space	-- <a href="#">Zwiers et al. (2003)</a> , <a href="#">Macaluso et al. (2002)</a>
9	Multisensory integration and action	-- <a href="#">Tremblay &amp; Nguyen (2010)</a> <a href="#">Juravle et al. (2010)</a>
10	Body schema	-- <a href="#">Blanke et al. (2005)</a> <a href="#">Rousseaux et al. (2013)</a>
11	Plasticity & development	-- <a href="#">Wallace et al. (2004)</a> , <a href="#">Gori et al. (2008)</a>
12	Plus and minus syndromes of multisensory perception: A crossmodal illusion vs. autism	-- <a href="#">Dieter et al. (2014)</a> , <a href="#">Fuxe et al. (2015)</a>

## VII) References

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- Bremmer F, Schlack A, Shah NJ, Zafiris O, Kubischik M, Hoffmann K, Zilles K, Fink GR (2001). Polymodal motion processing in posterior parietal and premotor cortex: a human fMRI study strongly implies equivalencies between humans and monkeys. *Neuron* 29:287-296.
- Deneve S, Latham PE, Pouget A (2001). Efficient computation and cue integration with noisy population codes. *Nat Neurosci*. 2001 Aug;4(8):826-31.
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- Their Resolution During Early Adolescenc. *Cerebral Cortex*, 25:288-312.
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- Gori M, Del Viva M, Sandini G, Burr DC (2008). Young children do not integrate visual and haptic form information. *Curr Biol* 18:694-698.\
- Hummel F, Gerloff C (2005). Larger interregional synchrony is associated with greater behavioral success in a complex sensory integration task in humans. *Cereb Cortex* 15(5):670-8.\
- Juravle G, Deubel H, Tan HZ, Spence C (2010). Changes in tactile sensitivity over the time-course of a goal-directed movement. *Behavioural Brain Research*, 208(2), 391- 401.
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- Spence C, Kingstone A, Shore DI, Gazzaniga MS (2001). Representation of visuotactile space in the split brain. *Psychol Sci* 12:90-93.\
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- Wallace MT, Perrault TJ Jr, Hairston WD, Stein BE (2004). Visual experience is necessary for the development of multisensory integration. *J Neurosci* 24:9580-9584.\
- Ward LM, McDonald JA, Lin D (2000). On asymmetries in cross-modal spatial attention orienting. *Perception & Psychophysics* 62:1258-1264. (no pdf)\
- Zwiers MP, Van Opstal AJ, Paige GD (2003). Plasticity in human sound localization induced by compressed spatial vision. *Nat Neurosci* 6:175-181.

### **VIII) Additional information**

#### **Missed Term Work due to Medical Illness or Other Emergency:**

All students citing a documented reason for missed term work must bring their documentation to the Psychology Course Coordinator in SW427C **within three (3) business days** of the assignment due date. You must bring the following:

- (1.) A completed Request for Missed Term Work form (<http://uoft.me/PSY-MTW>), and
- (2.) Appropriate documentation to verify your illness or emergency, as described below.

Appropriate Documentation:

For missed **TERM TESTS** due to ILLNESS:

- Submit an **original** copy of the official UTSC Verification of Illness Form (<http://uoft.me/UTSC-Verification-Of-Illness-Form>) or an **original** copy of the record of visitation to a hospital emergency room. Forms are to be completed in full, clearly indicating the start date, anticipated end date, and severity of illness. The physician's registration number and business stamp are required.

For missed **ASSIGNMENTS** due to ILLNESS:

- Submit **both** (1.) a **hardcopy** of the Self-Declaration of Student Illness Form (<http://uoft.me/PSY-self-declare-form>), **and** (2.) the **web-based** departmental declaration form (<http://uoft.me/PSY-self-declare-web>).

For missed term tests or assignments in OTHER CIRCUMSTANCES:

- In the case of a **death of a family member**, a copy of a death certificate should be provided.
- In the case of a **disability-related concern**, an email from your Disability Consultant at AccessAbility Services should be sent directly to both the Course Coordinator (psychology-undergraduate@utsc.utoronto.ca) and your instructor, detailing the accommodations required.
- For U of T Varsity **athletic commitments**, an email from your coach or varsity administrator should be sent directly to the Course Coordinator (psychology-undergraduate@utsc.utoronto.ca), detailing the dates and nature of the commitment. The email should be sent **well in advance** of the missed work.

Documents covering the following situations are **NOT acceptable**: medical prescriptions, personal travel, weddings, or personal/work commitments.

Procedure:

Submit your (1.) [request form](#) and (2.) [medical/self-declaration](#)/other documents in person **WITHIN 3 BUSINESS DAYS** of the missed term test or assignment.

**Submit to:** Course Coordinator, Room SW427C, Monday – Friday, 9 AM – 4 PM

If you are unable to meet this deadline for some reason, you must contact the Course Coordinator via email ([psychology-undergraduate@utsc.utoronto.ca](mailto:psychology-undergraduate@utsc.utoronto.ca)) within the three business day window. Exceptions to the documentation deadline will only be made under exceptional circumstances.

Within approximately one week, you will receive an email response from the Course Instructor / Course Coordinator detailing the accommodations to be made (if any). You are responsible for checking your official U of T email and Quercus course announcements daily, as accommodations may be time-critical.

Completion of this form does NOT guarantee that accommodations will be made. The course instructor reserves the right to decide what accommodations (if any) will be made. **Failure to adhere to any aspect of this policy may result in a denial of your request for accommodation.**

Note that this policy applies only to missed assignments and term tests. Missed final exams are handled by the Registrar's Office (<http://www.utsc.utoronto.ca/registrar/missing-examination>).

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### **References from Academic Handbook:**

Section V.1,

“Students who miss a term test for an acceptable reason should be offered a make - up test. For some courses it may be appropriate to allocate the value of the missed test to another test, or other piece(s) of term work, however, for A-level courses at UTSC, it is not permissible to transfer the value of a missed midterm to the final exam. Additionally, the practice of transferring the value of a missed midterm to the final exam in upper-level courses is discouraged.”

Section III.2,

“Student performance in an undergraduate course must be assessed over more than one assignment, and no single pieces of work (essay, test, examination, etc.) should have a value of more than 80% of the grade. Undergraduate field courses, independent study courses and project courses may be exempt from this requirement - in such courses, more than 80% of the final mark may be based on a thesis, a research essay or project, or an examination.”

“In any case in which the marking structure for a course is altered on an individual basis, the student in question must be given a written statement, signed by both student and instructor, which indicates the specific nature of the alteration or allocation in his case.”

Section III.3,

“You are not obliged to accept late work, except where there are legitimate, documented reasons beyond a student's control. In such cases, a late penalty is normally not appropriate. If you intend to accept and apply penalties for late submissions, you must state this clearly in your syllabus or course outline.”

### **Help With Writing**

If you would like help with academic writing, the following resources are available to you:

- The Centre for Teaching and Learning (AC312) Writing Centre offers students one-to-one appointments and supplementary materials to help improve upon their writing skills. <http://ctl.utsc.utoronto.ca/home/>  
<http://ctl.utsc.utoronto.ca/twc/>

- The English Language Development Centre offers support and specialized writing programs for students who do not speak English as their primary language. <http://ctl.utsc.utoronto.ca/eld/>

- Advice on academic writing

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

## **Academic Integrity**

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 (<http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppjun011995.pdf>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:

- Using someone else's ideas or words without appropriate acknowledgement; \
- Submitting your own work in more than one course without the permission of the instructor;
- Making up sources or facts; \
- Obtaining or providing unauthorized assistance on any assignment. \

On tests and exams: \

- Using or possessing unauthorized aids; \
- Looking at someone else's answers during an exam or test; \
- Misrepresenting your identity; and \
- When you knew or ought to have known you were doing it. \

In academic work: \

- Falsifying institutional documents or grades; \
- Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes; and \
- When you knew or ought to have known you were doing so. \

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If students



have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, they are expected to seek out additional information on academic integrity from their instructors or from other institutional resources. \

Note: \

You may see advertisements for services offering grammar help, essay editing and proof-reading. Be very careful. If these services take a draft of your work and significantly change the content and/or language, you may be committing an academic offence (unauthorized assistance) under the *Code of Behaviour on Academic Matters*. \

It is much better and safer to take your draft to the Writing Centre as early as you can. They will give you guidance you can trust. Students for whom English is not their first language should go to the English Language Development Centre. \

If you decide to use these services in spite of this caution, you must keep a draft of your work and any notes you made before you got help and be prepared to give it to your instructor on request. \

### **AccessAbility Services\**

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 the AccessAbility Services as soon as possible.\

AccessAbility Services staff (located in Rm SW302, Science Wing) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations [416-287-7560](tel:416-287-7560) or email [ability@utsc.utoronto.ca](mailto:ability@utsc.utoronto.ca). The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

### **Literature Searches**

Students can use the following resources when conducting literature searches to find relevant articles for their presentation and final essay:

The UTSC Library (AC235)

<http://www.library.utoronto.ca/utsc/>

PubMed

<http://www.ncbi.nlm.nih.gov/pubmed>

PsychINFO

<http://www.apa.org/pubs/databases/psycinfo/index.aspx>

Google Scholar

<http://scholar.google.ca/>

### **For Your Health**

The Health and Wellness Centre (SL270, 416-287-7065) provides diagnostic, treatment and referral services for all illnesses ranging from the medical to psychological to health promotion. The professional staff of physicians, nurses and counselors provides personal advice and assistance with family issues, eating disorders, depression, stress, drug and alcohol abuse, relationship issues, a positive space for gender/sexuality issues, and more.

<http://www.utsc.utoronto.ca/wellness>