

NROC64: Sensory and Motor Systems

I) Course information

Course number: NROC64H3 S

Mondays: 3 pm – 5 pm

Place: SY 110

Thursdays: 2 pm – 3 pm

Place: AA 112

Prerequisites: BIOB30H & NROB60H

II) Instructor:

Dr. Matthias Niemeier

1265 Military Trail SW569

phone: 416-287-7466

e-mail: niemeier@utsc.utoronto.ca I will respond within two working days.

Office Hours: Thursdays, 11 am - 12 pm or per appointment (usually by email).

III) Teaching Assistants:

Ada Le & Sherrie Thiele

IV) Blurb

A focus on the mechanisms by which the nervous system processes sensory information and controls movement. The topics include sensory transduction and the sensory physiology for each of the sensory systems (olfactory, visual, somatosensory, auditory, gustatory) and models of sensory processing. Both spinal and central mechanisms of motor control are also covered.

V) Course readings (required)

Textbook

Title: Neuroscience. Exploring the Brain, 3rd Edition

Authors: M. F. Bear, B. W. Connors & M. A. Paradiso

Publisher: Lippincott, Williams & Wilkins

ISBN: 978-0-7817-6003-4

Additional readings

I will post additional reading material on the intranet. Information about these readings will be provided in an updated version of this syllabus

VI) Web pages

Course Web Site: intranet page

Here you will find the syllabus, and announcements. Also, I will put the lecture slides on that page.

Please check on a regular basis for announcements.

VII) Evaluation

10% Quizzes. 7 best quizzes out of 11 possible ones.

35% Mid-term test. Weights: 50% MCQs, 50% short answer questions. Two hours.

55% Final Term test. Two hours. Same format as mid-term.

Quizzes will consist of ~10 yes/no questions each. Quizzes will take place during every Monday lecture, *except* for the first Monday. Each quiz will ask questions about the reading materials of the respective day. There won't be an opportunity to write make-up quizzes but then, you don't need to participate in all quizzes to get a perfect score because there will be 11 quizzes in total but I will count only your top 7 quiz scores. On the other hand writing more than 7 quizzes means you can improve your overall quiz score by participating in more than 7 quizzes.

Exams will have multiple-choice and short-answer questions. Material on the exams will include lecture material and text readings. Although the topics covered will overlap, different things may be emphasized in class than in the book or other readings. Therefore, I recommend class attendance and I recommend reading all the materials.

Missing an exam: If you miss the mid-term exam you will be asked to provide documentation for why you missed it. Documentation has to meet usual standards, e.g., for medical notes I will ask for the official UTSC form, and I will ask forms to be filled in by experts. That is, for medical reasons you will need an M.D. to fill in your form, for psychological reasons you will need an M.D., a clinical psychologist or counsellor etc. For people with valid documentation there will be one make-up exam held ~1 week after the mid-term. The format of the make-up exam might be different from the mid-term, such as, it might contain short-answer questions only.

If you miss the final exam, you are asked to petition to write the test through the Registrar's office, usually one term later.

Difficulties with the course: Please talk to me if you are having difficulties with the course. The earlier the better. I will try my best and am happy to help. Especially, please come before an exam is to be held. Afterwards is too late. Please note, that as per university policy it is not possible to negotiate better grades.

VIII) Schedule

This schedule is subject to changes as we go along, please see intranet for updates.

Wk	Dates	Topic	Chapter (Chap)/ additional readings (AR)	Quiz
1	10/01/11	Welcome & Introduction, Chemical senses	Chap 8	
	13/01/11	Chem. senses cont'd	Chap 8	
2	17/01/11	The Eye	Chap 9	Quiz 1
	20/01/11	Visual pathways	Chap 10	
3	24/01/11	Central visual system	Chap 10	Quiz 2
	27/01/11	Visual deficits	Chap 10	
4	31/01/11	The auditory system	Chap 11	Quiz 3
	03/02/11	The vestibular system	Chap 11	
5	07/02/11	The somatic sensory system	Chap 12	Quiz 4
	10/02/11	Somatic senses cont'd	Chap 12	

19/02/11		Mid-term	8-12	
6	14/02/11	Multisensory perception	AR 1 & AR 2	Quiz 5
	17/02/11	Multisensory & maximum likelihood estimation	AR 3	
7	28/02/11	Spinal control of movement	Chap 13	Quiz 6
	03/03/11	Spinal control of movement cont'd	Chap 13	
8	07/03/11	Brain control of movement	Chap 14	Quiz 7
	10/03/11	Brain control of movement cont'd	Chap 14	
9	14/03/11	Eye movements	AR 4	Quiz 8
	17/03/11	Eye movements and spatial constancy	AR 5	
10	21/03/11	Reaching and grasping	AR 6	Quiz 9
	24/03/11	Reaching and grasping cont'd	AR 7	
11	28/03/11	Spatial coordinates for action	AR 8	Quiz 10
	31/03/11	Spatial coord.s cont'd	--	
12	04/04/11	Attention	Chap 21	Quiz 11
	07/04/11	Attention cont'd	Chap 21	
TBA		Final exam	13,14,21+	

Additional readings (AR):

- AR 1:

Senkowski D, Schneider TR, Foxe JJ, Engel AK (2008). Crossmodal binding through neural coherence: implications for multisensory processing. *Trends in Neuroscience*, 31(8):401-409.

- AR 2:

Stein BE, Stanford TR (2008). Multisensory integration: current issues from the perspective of the single neuron. *Nature Reviews Neuroscience*, 9(4):255-266.

- AR 3:

Ernst MO, Bühlhoff HH (2004). Merging the senses into a robust percept. *Trends in Cognitive Sciences*, 8(4):162-169.

- AR4: chapter 39 on gaze control from

Kandel ER, Schwartz JH, Jessel TM (2000). *Principles of neural science*. New York: McGraw-Hill, 4th edition.

- AR5:

Wurtz RH (2008). Neuronal mechanisms of visual stability. *Vision Research*, 48:2070-2089.

- AR6:

Battaglia-Mayer A, Caminiti R (2008). Posterior parietal cortex and arm movement. In: *Encyclopedia of Neuroscience*.

- AR7:

Castiello U (2005). The neuroscience of grasping. *Nature Neuroscience*, 6: 726-736.

- AR8:

Cohen YE, Andersen RA (2002). A common reference frame for movement plans in the posterior parietal cortex. *Nature Neuroscience*, 3: 554-562.

IX) AccessAbility Statement

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 Office as soon as possible. I will work with you and AccessAbility Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC AccessAbility Services staff (located in SW302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or ability@utsc.utoronto.ca.

X) Academic Integrity Statement

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/policies/behaveac.htm>) 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. 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. 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 (see <http://www.utoronto.ca/academicintegrity/resourcesforstudents.html>).

XI) webOption

No online section is currently available for NROC64.

XII) Course Policies

For other academic regulations please also refer to the UTSC calendar.