

Psych 3MM3: Cognitive Neuroscience Laboratory

(2011-2012, Term 1)

1. Instructor: [Dr. Hong-Jin Sun](#)
Office: Room 415, Psychology Building, 905-525-9140, Ext. 24367
Lab: Room 213, Psychology Building, Ext. 26031
Email: sunhong@mcmaster.ca,
 - Please include expression “3MM3” in your email subject heading
2. Teaching Assistants:
Mr. Michel Belyk, belykm@mcmaster.ca, ext. 21443
Miss Emilie Harvey, harvee3@mcmaster.ca, ext. 24489
3. Classroom: Psychology Building, Room 204 & 116 (occasional),
Class time: Monday 15:30-17:20 am; Thursday 16:30-17:20 am;
Tutorials (some weeks): Tuesday 16:30-17:20 am
4. Course web page: <http://vr.mcmaster.ca/lab/3MM3web/>
5. Virtual classroom: <http://avenue.mcmaster.ca>

This page was last updated on Saturday, September 17, 2011

Table of Contents

1. [course objectives](#)
2. [brief description](#)
3. [list of content](#)
 1. Project 1: Scene Recognition
 2. Project 2: Independent project
 3. Project 3: Neuroanatomy of the sheep brain
4. [schedule](#)
5. [evaluation](#)
 1. [detailed requirement](#)
6. [readings](#)

COURSE OBJECTIVES

In this lab course students will have the opportunity to learn to conduct research in the area of cognitive neuroscience. They will

- (1) gain experience in research design, including forming experimental hypotheses, designing experiments, collecting data, analyzing data, interpreting the empirical results, critically evaluating research papers,
- (2) practice communicating your findings through written and oral presentations.
- (3) learn more about the brain through a hand-on experience of brain dissection.

BRIEF DESCRIPTION

This course consists of three major parts. The 1st part of the course, project 1 (P1) which is scheduled in the first five weeks of the term, consists of a project with the goal being to help students develop skills in experimental design and in communication. This will be accomplished through having all students in the class conducting the same experiment and each student write a lab report individually.

The 2nd part of the course is a group lab project (project 2, P2). The class will be divided into 5 groups (4-5 students each) and each group will design and conduct their own experiments. You are expected to do a literature research to derive your hypothesis. You will do most of your work without direct supervision but the TAs and the instructor will be available to help you as resource persons and should be consulted on a regular basis during the development, running and analysis of the experiments. In the end, the group should provide a written report and give an oral presentation to the whole class about their studies.

For the 3rd part of the course, students will work in pairs to perform a dissection of a sheep brain. You are required to recognize and memorize some important brain structures with the help of the TAs and a sheep brain atlas. A bell ringer style exam will be conducted afterward.

During the course, we will review topics such as research ethics, research design, statistics, use of spreadsheet software, data collection, and presentation, etc.

LIST of CONTENT

Lectures

1. General research issues
 1. Ethics in research using human subjects
 2. Research design
 3. Basic statistical analysis
 4. Writing of lab report
 5. Oral presentation
2. Topics related to the lab projects
3. Statistical software: SPSS

SCHEDULE

Wk-h, date	Due 20 hours before class	During Class	Things to do after class, in addition to assignments
Wk1-h1 Sept08		<ul style="list-style-type: none"> LECTURE: Introduction to the course P1: Scheduling data collection 	<ul style="list-style-type: none"> Review course outline & email instructor your comments for the course design
Wk2-h1-3 Sept12-15		<ul style="list-style-type: none"> No class (P1 data collection during the week) Background literature provided following data collection 	<ul style="list-style-type: none"> Read P1 background literature (the required paper) during the weekend
Wk3-h1&2 Sept19		<ul style="list-style-type: none"> P1: Lecture: Rationale of the study LECTURE: Experimental design basics P1 exp design: Group then class discussion 	<ul style="list-style-type: none"> Read instructor's guide on writing lab report Finish draft of P1 Introduction & Method Statistics review (including t-test)
Wk2-h3 Sept22	P1: Exp design (individual work)	<ul style="list-style-type: none"> LECTURE: Scientific communication & writing lab report, part 1 (Intro and Method) Provide raw data to the class 	
Wk3-h1&2 Sept26		<ul style="list-style-type: none"> Tutorial (room 154): data analysis (SPSS), descriptive statistics LECTURE (cont'd): writing lab report, part 1 (Intro and Method) 	
Wk3-h3 Sept29	P1: Intro & Method (individual work)	<ul style="list-style-type: none"> P1: Review of students' writings (Intro & Method) P1: Lecture: Data analysis Lecture on writing lab report, part 2 (Results and Discussion) 	<ul style="list-style-type: none"> draft P1 Results & Discussion
Wk4-h1&2 Oct03	P1: Data analysis (individual work)	<ul style="list-style-type: none"> Tutorial (room 154): data analysis, pivot table (excel), then SPSS, inferential statistics P1: Lecture: Data analysis Lecture on writing lab report, part 2 (Results and Discussion) 	<ul style="list-style-type: none"> Finish draft of P1 Results & Discussion

Wk4-h3 Oct06	P1: Results and Discussion (individual work)	<ul style="list-style-type: none"> • P1: Questions and individual feedbacks • LECTURE: conducting independent research • P2: Lecture: Project 2 (P2) • Lecture: literature search • P2: group membership 	<p>P2: Literature search (a guide compiled by Dr. Dukas)</p> <p>http://psych.mcmaster.ca/dukas/LibInf.htm</p>
Wk5-h1&2 Oct10 Thanksgiving			
Wk5-h3 Oct13		<ul style="list-style-type: none"> • P1: Lecture: Review of students' writing (Results and Discussion) 	<ul style="list-style-type: none"> • P2: decide on the project & possible switching of groups • Peer review of P1 Intro&Method
Wk6-h1&2 Oct17		<ul style="list-style-type: none"> • Lecture: ethics in conducting research using human subjects • P2: Group Discussion • P2: Feedback for the groups' design 	<ul style="list-style-type: none"> • P2: Pilot data collection
Wk6-h3 Oct20	P2: Proposal & relevant literature (pdf files) (group work)	<ul style="list-style-type: none"> • P2: Feedback to groups on the proposal 	<ul style="list-style-type: none"> • P2: pilot data collection
Wk7-h1&2 Oct24	P2: Proposal slides (group work)	<ul style="list-style-type: none"> • P2: Group proposal presentation in class 	<ul style="list-style-type: none"> • P2: Data collection
Wk7-h3 Oct27		P3: Lecture: Neural anatomy & sheep brain dissection	<ul style="list-style-type: none"> • Review neuroanatomy
Wk8-h1&2 Oct31		P3: TUTORIAL1: Sheep brain dissection (surface & mid-sagittal plane)	<ul style="list-style-type: none"> • P2: Data collection
Wk8-h3 Nov3		<ul style="list-style-type: none"> • P2: Group discussion: pilot data and data analysis 	<ul style="list-style-type: none"> • P2: Data collection
Wk9-h1&2 Nov7	P2: Intro and Method & relevant literature (pdf files) (group work)	<p>P3: TUTORIAL2: Sheep brain dissection (subcortical structures)</p> <ul style="list-style-type: none"> • P2: Feedback to groups on Intro & Method 	<ul style="list-style-type: none"> • P2: Data collection
Wk9-h3 Nov10		P3: TUTORIAL (review, optional): Sheep brain dissection	TUTORIAL (review, optional): Sheep brain dissection
Wk10-h1&2 Nov14		P3: Sheep brain practical exam	
Wk10-h3		<ul style="list-style-type: none"> • P2: Group discussion 	

Nov17			
Wk11-h1&2 Nov21	P2: Results and Discussion & relevant literature (pdf files) (group work)	<ul style="list-style-type: none"> • P2: Group discussion • P2: Feedback on the Results/Data Analysis 	
Wk11-h3 Nov24		<ul style="list-style-type: none"> • P2 Lecture: presentation requirement • Presentation preparation & feedback 	
Wk12-h1&2 Nov28	Presentation slides (group work)	STUDENT GROUP PRESENTATION in class (2 groups)	
Wk12- Nov29 TutorialTime	Presentation slides (group work)	STUDENT GROUP PRESENTATION in class (1 group)	
Wk12-h3 Dec1	Presentation slides (group work)	STUDENT GROUP PRESENTATION in class (1 group)	
Wk13-h1&2 Dec5	Presentation slides (group work)	STUDENT GROUP PRESENTATION in class (1 group)	
	Exp notes (group) Group peer evaluation (individual)	End of the term	

EVALUATION

CATEGORY	DETAILS	GRADE (%)		Identifier for electronic submission (file name)	hardcopy requirement
		as an individual	as a group		
P1	Exp design	0		P1Design	No
	Data analysis	0		P1DataAnalysis	No
	Intro & Method	12.5		P1ReportPart1 P1ReportPart1-Ref#	Yes No
	Results & Discussion	12.5		P1ReportPart2 P1ReportPart2-Ref# P1ReportPart2-Data	Yes No No
P2	Proposal		2	P2Proposal P2Proposal-Ref#	No
	Proposal presentation		5	P2PresentProposal-Slides	No
	Intro & Method		7.5	P2ReportPart1 P2ReportPart1-Ref# P2ReportPart1-Software	Yes No No
	Results & Discussion		7.5	P2ReportPart2 P2ReportPart2-Ref# P2ReportPart2-Data	Yes No No
	Presentation		10	P2PresentFinal-Slides	No Yes
	quality of the experimental work		5		
P1 & P2	Exp notes (hardcopy and/or files posted in Avenue)		3		Yes/no
	Individual contribution to the group (rated by group peers, TAs and instructor)	10		PeerEvaluation	No
P3	Neuroanatomy (sheep brain) test	15			
Participation	rated by instructor and TAs	10		CourseFeedback	No
TOTAL		60	40		

DETAILED REQUIREMENTS

1. Assignment file name format

- In addition to the hard copy requirements, with the exception of group lab notes for P2, **all** documents should be submitted electronically through Avenue. You must use the **EXACT filename** format outlined below (including “_”) and no empty space within filename.
 - Use expression “**3MM3_AssignmentType_Author**”
 - The **file name** = the expression above + file extension (e.g., .xls or .doc or .ppt)
 - For the “**AssignmentType**” field, use the proper assignment **identifier** (see table above).
 - For the “**Author**” field,
 1. for group work, use your group number
 2. for individual work other than P1 lab report, use your “lastName_firstName”
 3. For P1 report, use **your personal code**, which is the 2-digit code assigned to you in class (for the purpose of anonymous review)
 - a. For P1 lab report, to remain anonymous in the peer review process, you also need to remove identity of the author/reviewer in the file
 - i. In MS Word, on the Tools menu, click Options, and click the Security
 - ii. Select the “Remove personal information from this file on save” check box.
 - iii. Save the document.
 - iv. Do not have a dedicated title page for your lab report (even though standard APA format requires one)

2. Lab Reports

- All written reports submitted must be double-spaced, one-sided, 8.5x11 inch with 1 inch margins using a 12-point font.
- You should submit *both* hard copy and electronic files, which include both text and figures (in Microsoft Word format, with figure copied from Excel/SPSS graph) and data (in Excel/SPSS format) for the analysis.
- The due dates of the electronic files of most of the assignments are 16 hours before start of the class time. The hardcopies (with identical content of the electronic ones) can be handed in during class. Late penalty will imposed at 10% of that part per day.
- You are also required to submit the pdf files of important articles (ONLY those that have NOT been provided by the instructor) cited in your report.
- Grades will be given according to style (APA format), grammar, content, and also on the quality of the writing, coherency, and clarity of thought.

3. Project 2

- Proposal
 - a. The format of proposal could be a short version of the introduction and method of a typical lab report. You are encouraged to write in the format of a formal introduction and method (longer than 2~3 pages) at this point, as that will be required later anyway.
 - b. the first part of the proposal should be literature review. You are required to also submit electronic files of important articles (at least 3) cited in your report.

- c. You should provide detailed review of the articles closely related to your research, much like writing an introduction of a lab report. You should comment on how the research would be related to your project.
- d. To demonstrate the work you have done, at the end of your literature review, you are also encouraged to list (and possibly provide a sentence or two of summary -- could be in point form) the articles that you have researched but eventually decide not to discuss in detail.
- e. the 2nd part to the proposal should be description of your experiment.
- Data analysis should be performed during the process of running the experiment, rather than at the end of the experiment. You are encouraged to present your results often to the instructor or teaching assistants to seek feedback.
- Presentation
 - a. Before the presentation, electronic files relevant to the presentation should be submitted. These files will then be posted on the web for other students to review.
 - b. Everyone in the group should participate in the final oral presentation and group members must try to participate equally in the presentations.
 - c. Oral presentation will be graded for group performance as well as for the performance of each individual.
 - d. Presentation should incorporate proper audiovisual aids (e.g., powerpoint slides) and handout (if necessary). The final version of the presentation slides (e.g., powerpoint file) should be sent to the instructor electronically afterwards.
- Each group is free to organize itself as it thinks best (e.g., dividing responsibility, working in sub-group, or working together). But it might be practical to designate one member of the group as the facilitator/organizer for each stage of the project and he or she will be eventually responsible for the performance of that stage.
- At the end of P2, each group should provide the name of the major contributor(s) to the each section of the project and provide justification for the choices and such statement should be approved by the majority of the group members. The major sections that should cover (but not limit to) the following
 - a. Generate experimental ideas (not necessarily the one adopted)
 - b. Generate experimental design
 - c. Finalize the procedure
 - d. Prepare experimental apparatus, materials including software
 - e. Write proposal
 - f. Write different sections of the lab report
 - g. Organize, manage the experiment progress

4. P2 experiment notes (electronic version or hard copy)

- It must contain enough information to allow yourself or others to repeat the work exactly as you have done it. Record everything that you plan for the experiment and perform and observe as you carry out the experiment as well as each of the steps and the results when you analyze your data.
- On the top right corner of each page, specify the name of the individual(s) who produced the note and individual(s) who performed the task.
- The first page of your notes is reserved for a table of contents. All subsequent pages are numbered. The table of contents should indicate the title of the experiment and the page number in the book.
- Recordings in the notes should be written at the time when the experiment/analysis is carried out (*NOT at the end of the term and right before the notes are due!*).

- For electronic files, post it on Avenue or zip all the files together before submission. For hardcopy materials, fasten copies of any diagram, graphs or images obtained during the course of the experiment or analysis into the book, only IF these files have NOT been sent to the instructor electronically.

5. Peer evaluation within the group

- At the end of the project, each member should provide written evaluation on the contribution of each member of the group.
- Both grades and written justification should be provided for ALL aspects of the experimental project (e.g. including intellectual contribution and contribution of time and effort, etc).
 - a. at the **beginning** of your file, list the grades for all members (except you) of your groups for the following two aspects of their contributions (mark out of 10)
 1. intellectual contribution
 2. contribution of time and effort
 - b. then the justify the grade you give for each member of the group
- Normally, all group members will be given the same grade for the joint performance in project 2 (e.g., oral presentation, lab report, etc), but the instructor reserves the right to use the grades from peer evaluation as a factor to adjust other parts of the P2 grade for certain individuals (e.g., those who contribute very little to the joint effort).

6. Class participation grade will be given considering the student's performance in the following aspects:

- Attend class and group meeting **and arrive on time**
- Active learning
 - a. Finish assignments
 - b. Contribute to class and group discussion
 - c. Contribute to online/email discussion
 - d. Contribute to experiment
 - e. Contribute to peer review of the lab report
 - f. Contribute to the experiment notes of the group
 - g. Contribute to literature search (students are encouraged to share suitable articles to the group, possibly through Avenue)
 - h. Show initiative in organizing group activities
- Provide extensive and informative feedback to the oral presentation of other groups.
- Provide feedback and suggestion to the teaching of this course.

7. Final Grade

Final grades will be assigned according to the following conventional scheme:

90-100	85-89	80-84	77-79	73-76	70-72	67-69	63-66	60-62	57-59	53-56	50-52	0-49
A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

The instructor reserves the right to adjust final marks up or down, on an individual basis, in the light of special circumstances and/or the individual's overall performance in the course.

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

Attention is drawn to the *Statement on Academic Ethics* and the *Senate Resolutions on Academic Dishonesty* as found in the Senate Policy Statements distributed at registration and available in the Senate Office. Any student who infringes one of these resolutions will be treated according to the published policy.

READINGS

1. Required Readings

1. Book for Project 3: Vanderwolf, C. H. and Cooley, R. K. (1990). *The sheep brain: A photographic series*. London, Ontario, Canada: A.J. Kirby Co. (Need page 15-40). Available in bookstore.

2. Recommended Readings

1. Guide to writing lab report

1. American Psychological Association. (2009). *Publication manual of the American Psychological Association* (6th ed.), Washington, DC: Author.