PNB 4J03: Inquiry in Psychology, Neuroscience & Behaviour
COURSE SYLLABUS  FALL TERM 2012

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Where/when:  JHE/A102  Mondays 9:30 – 10:20 am; Thursdays 9:30 – 11:20 am
Office Hours:  By appointment. The best way to contact us is via email or in person in class.

Please use your McMaster email account. Should we need to communicate with you, the email will be sent to your mcmaster.ca account. Email sent from third-party providers (yahoo, hotmail, cogeco, sympatico, etc.) may not be received. We have this policy for three reasons: 1. reduce the amount of incoming spam to our accounts; 2. ensure that we know with whom we are communicating; 3. teach the professional use of e-mail. Please note that instructors cannot return long distance phone calls.

Overview:  PNB 4J03 is an upper level Faculty of Science course dealing with the systematic investigation of broad topics within the field of Psychology, Neuroscience & Behaviour. Inquiry is a process of critical thinking. We will review the basic tenets and principles pertinent to conducting science: the scientific method, hypothesis testing, experimental design, data analysis and interpretation, and the reporting of scientific findings. Students will engage in self-directed research, critical thinking, and problem solving, and will gain experience in the evaluation of the sources and content of existing research. Students will strengthen their scientific writing and oral presentation skills by writing critiques of research articles, leading presentations and discussions, and developing, writing, presenting, and defending a research grant proposal. Students will gain experience with peer evaluation through critical evaluation of the logic, the scientific writing and oral presentations of their classmates.

Web Site:  Avenue to Learn; check often for announcements

Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

Students should also be aware that they will be providing feedback and evaluations of other students. In doing this, your identity may be known to the other student even when names are removed from the written work. Be honest in your assessment of their material and provide constructive comments. The only way to improve your writing is to write often and have your writing read and critiqued by others. If you are uncomfortable with having other students read your writing, you should talk to the instructor of the course.

At certain points in the course it may make good sense to modify the schedule; the instructor reserves the right to modify elements of the course and will notify students accordingly (in class and post any changes to the course website).
| SEPT | Thurs 06 | Course introduction. Discussion and workshops: Topics include inquiry, scientific method, scientific reporting, anatomy of scientific paper, literature, peer review, experimental design, hypothesis testing, statistics, ethics, etc. Introduction to research theme: cognitive and emotional control |
| Mon 10 | | |
| Thurs 13 | | |
| Mon 17 | Discussion and workshops: continued; see above Each reading group: Post full reference and McMaster permalink for the paper you will be discussing; post as soon as possible to give other students time to read it. |
| Thurs 20 | Students present assigned readings and lead discussions: \[ \text{Reading Groups: } 1,2=\text{Sept20}; \ 3=\text{Sept24}; \ 4,5=\text{Sept27}; \ 6=\text{Oct1}; \ 7=\text{Oct4}. \] Presenting students will each submit a written critique of a primary research article cited in the reading, due \text{BBOC}. All students: Avenue discussion post \text{BBOC} (not required for the paper you are presenting) |
| Mon 24 | Thurs 27 |
| Mon 01 | Thurs 04 (1\textsuperscript{st} hour) |
| OCT | Thurs 04 (2\textsuperscript{nd} hour) Discussion and workshops: Topics include research grant; peer evaluation; Anonymous written critiques distributed for peer review |
| Mon 08 | Thanksgiving, no class |
| Thurs 11 | Peer evaluations of written critiques, due \text{BBOC} Workshops (in class): Grant writing |
| Mon 15 | Thurs 18 Workshops (in class): Grant writing |
| Mon 22 | Workshops (in class): Grant writing Group progress report due \text{BBOC} and Self and group assessments due \text{BBOC} |
| Thurs 25 | Workshops (in class): Grant writing |
| Mon 29 | |
| NOV | Thurs 01 Workshops (in class): Grant writing Each group: Post full reference and McMaster permalink for the paper you will be discussing in Part One oral presentation; post as soon as possible to give other students time to read it. |
| Mon 05 | Workshops (in class): Grant writing |
| Thurs 08 | All groups submit written research proposal before the end of the day Workshops (in class): Oral presentations |
| Mon 12 | Part One oral presentation: \[ \text{Research Groups: } 1,2=\text{Nov12}; \ 3,4=\text{Nov19}; \ 5,6=\text{Nov26} \] All students: Avenue discussion post \text{BBOC} (not required for the paper you are presenting). Students assigned to peer evaluation of previous week’s proposals: due \text{BBOC}: \[ \text{PeerReview Groups: } 1,2=\text{Nov19}; \ 3,4=\text{Nov26} \] |
| Mon 19 | Mon 26 |
| Mon 03 | Students assigned to peer evaluation of previous week’s proposals: due \text{BBOC}: \[ \text{PeerReview Groups: } 5,6=\text{Dec3} \] Self and group member assessments due \text{BBOC} Course wrap up |
Assignments: There will be several assignments; some are written and some involve both a written and oral component. These are laid out in detail below. Written assignments must be submitted to the appropriate Avenue dropbox folder before the beginning of class on the due date. Late work will not be accepted. Always keep a dated copy of your work for your records.

You will be assigned to three different groups: Reading Assignment group (for work in September and October), Research Proposal group (for work in October to December), and Research Proposal: Peer Review group (which does not require group work; it refers to which group you will peer review).

Students are assigned to groups and presentation dates using a pseudo random process with constraints so that tasks and due dates are as evenly distributed as possible. You can find your group on Avenue. Substitutions can be made only if you find another student willing to trade (and with the permission of the instructor), with the acknowledgement that this might mean that one or both of you end up with some overlapping due dates (for example, you might end up doing your research proposal oral presentation on the same day as your research proposal peer review – this is the sort of thing the constrained random ordering process avoids).

Everyone’s schedules will be different; we highly recommend that each student construct a detailed calendar with due dates and work time line clearly laid out.

Self assessments: Self assessments and group member assessments will be collected on October 22 and December 3. Forms will be provided to guide your assessments. These assessments are confidential and should not be shared with other group members. The assessments will be considered when final grades are determined.

Avenue discussion board posts: All students are expected to come prepared to contribute to all discussions. To help keep the reading on track, there will be 10 (very brief) discussion board posts (6 in September and October; 4 in November). Students who are not presenting or leading a discussion of a particular paper are responsible for reading the paper before coming to class and writing about a few observations related to the paper. The observations you make are completely up to you. They should be unique (don’t copy what another student writes), intellectually interesting (evaluative; think critically), and brief (between 100 and 200 words). Note that I used 128 words to write this paragraph. These posts are not graded; credit is a part of the 25% participation grade.

Reading Assignment: Critique (10%): This assignment involves a written critique as well as an oral presentation and discussion in class. This assignment, along with the associated peer review, will give you practice for the main research proposal assignments in November. A reading list with approximately 30 papers from the journal “Trends in Cognitive Sciences” will be available on Avenue (McMaster permalinks provided). These are short review papers that are relevant to research on cognitive and emotional control. You will be leading a class discussion on one of these papers, and you will be writing a 2 page critique of a primary journal article that is cited in the selected review paper.

Steps to take:

1) Oral: Along with the 2-3 other members in your Reading Group, select a review article from the reading list that interests your group. You will present this review paper in class on your assigned day, and lead a class discussion. Each group member is expected to contribute. You can assume that all the other students in the class will have read the review, but you will be reading it more closely. Your task is to briefly summarize the review paper for the class, and then get some discussion going. You should come prepared with several questions and discussion points ready in case the discussion flags.

a) By September 17th, you should have already provided the full reference and McMaster permalink for the paper you will be discussing by posting to the Avenue discussion board under your Reading Group’s forum topic.
b) You are welcome (but it is not necessary) to prepare PowerPoint slides if they will help to illustrate important points. You must bring your own computer for this, and take care of all the audio/visual yourself (the instructor or TA will unlock the projector for you).  

2) Written: Choose a primary research paper that is cited in the review that you determine is pivotal to the review. Each group member is free to choose a different primary research article. Write a 2 page critique of the primary research article.  
   a) Include the full reference and the McMaster permalink to your primary research article at the top of the page.  
   b) The first part of the critique should include a new title for the paper and an abstract that summarizes the article in about 300 words.  
      i) Do not use the title and abstract from the paper, write new ones and attempt to improve on the existing ones. A title is the ultimate summary of an article. It should be very specific yet interesting (i.e. eye-catching) so as to entice someone to read the article, plus the title should distinguish the study from other articles in the same research area. An abstract is a concise summary of an article and is often the most important part of a paper. Many scientists will first read the abstract of a paper in order to decide if the article is worth reading in greater detail. Very often the abstract is the only part of an article that is ever read (and sometimes the title is the only thing that is ever read!), hence the importance of writing a title and abstract that clearly reflects the article’s contents. An abstract should summarize the background and rationale for a study; any important, unusual or new methods used to conduct the study; the major experimental findings; important or novel conclusions drawn from the study, and their relevance to what is already known.  
   c) The second part of the critique should be a critical analysis of the paper.  
      i) Include the full reference and the McMaster permalink at the top of the page.  
      ii) Imagine you are reviewing the paper to determine whether it should be published. This kind of peer review is an important responsibility for all scientists. Are there any problems with the paper? Are there parts that are not clearly written? Problems with the design of the experiments, such as a missing control condition or possible confounds? Are there any claims that are not well supported? Would you recommend it for publication? Write as if you are providing constructive criticism to the authors.  
   d) Submit your critique in your dropbox folder on Avenue before class on the day you are presenting. It must be in Word format (not PDF) with a “doc” or “docx” extension, not more than 2 pages, 12 pt font, double spaced, 1 inch margins all around.  
      i) Reading Groups: 1,2=Sept20; 3=Sept24; 4,5=Sept27; 6=Oct1; 7=Oct4.  

Reading Assignment: Critique Peer Review (5%): The goal is to give students practice with evaluating the scientific writing of their peers. Students will evaluate an anonymous critique, which will be made available on October 4th. Note that the reviewer of your critique still might be able to identify you even though your name has been taken off the critique.  
Steps to take:  
1) Read the primary journal article that was critiqued. Read the critique.  
2) Write a brief (less than 300 words) peer review of the critique.  
   a) Examples of the sorts of things you might look for include (but are not limited to): What are the strengths and weaknesses of the critique? What are the weaknesses of the abstract? Does the abstract you are reading clearly summarize the background and rationale of the study? Does it include important, unusual or new methods, the major experimental findings, the important and/or novel conclusions; and the relevance of the results to what is already known? Are their criticisms constructive and helpful to the authors?
b) Submit your peer review in your dropbox folder on Avenue before class on October 11. It must be in Word format (not PDF) with a “doc” or “docx” extension, not more than 300 words, 12 pt font, double spaced, 1 inch margins all around.

**Research Proposal: Progress Report (5%)**: The progress report is a group assignment. In less than one page, provide an outline that describes what you have been doing in preparation for the research proposal and oral presentation. Include progress so far, what is still left to be done, any pitfalls you have encountered, and an evaluation of how the group is working together.

1) Upload the progress report to your Research Group’s dropbox folder on Avenue before class on October 22.
   a) The submitted proposal must be in Word format (not PDF) with a “doc” or “docx” extension, not more than 1 page, 12 pt font, double spaced, 1 inch margins all around.

**Research Proposal (20%)**: The research proposal provides practice with innovative thinking, literature searches, designing scientific experiments, and communicating ideas in writing. You will be working in collaboration with 3-4 peers. Using one of the review papers from the reading assignment as a jumping off point, the topic of the proposal will be decided upon mutually and can be in any area of experimental psychology. Each group must have their topic approved by the instructor before proceeding with their project.

Steps to take:
1) Select one of the papers from the reading list as a jumping off point; it does not have to be one that was discussed in class.
   a) There will be many unanswered questions of scientific and/or clinical importance related to the paper you have chosen. Brainstorm as a group to define a problem or question within this area that is interesting, important, and can be tested.
   b) Conduct a thorough literature search to understand what is currently known about the question and synthesize this literature into an introduction.
   c) Design an experiment or sets of experiments to answer the question. Construct null and alternative hypotheses. Define the dependent and independent variables. Decide ahead of time what statistics you will use. Prepare predicted outcomes and possible alternative outcomes.
   d) The grant proposal should outline the rationale for the study, the specific experiments that address each question posed, and the broader anticipated significance of the research and potential findings.
      i) Go online and explore the requirements for an NSERC or CIHR grant proposal. This is the sort of thing you are aiming for.
2) Some notes about group work: All members of the group must be actively involved, but you can divide up the work as you see fit. Each group is free to organize itself – problems solving, dividing responsibility and organizing the workload, working together or in sub-groups – but must keep the instructor informed on how the group is functioning and on the knowledge it has gained.
   a) Learning how to manage your time within the constraints of a group is part of what you are learning. The written grant proposal is due November 8th, no exceptions.
   b) I have scheduled four weeks of in-class time for preparation of your grant proposal and oral presentation. Your group will meet in JHE/A102 every Monday and Thursday during regular class time over that period. The instructor and TA will be there as well, consulting with each group during that time. We are available for consultation as often as each group (or group member) likes on any topic. You are also free to consult with other experts on campus or on the Internet for help. Groups will also likely need to meet outside of normal class times to maintain progress on their work.
c) By November 1st, you should have already provided the full reference and McMaster permalink for the paper you will be discussing in the oral presentation (part one) by posting to the Avenue discussion board under your Research Group’s reading topic.

3) Submitting your research proposal: Upload your document to your Research Group’s dropbox on Avenue before the end of the day on November 8.
   a) The submitted proposal must be in Word format (not PDF) with a “doc” or “docx” extension, not more than 8 pages (excluding figures, references, and appendices), 12 pt font, double spaced, 1 inch margins all around.

Research Proposal: Oral Presentation (20%): The oral presentation of the research proposal is prepared and presented as a group. The goal is to give students practice with verbal communication: oration, thinking on your feet, and convincing peers/critics that your research is well designed, meritorious, and worthy of funding.

Steps to take:
1) Oral presentations occur in two parts. Each group member must participate in both parts.
   a) Part One: on Monday your group will introduce your research topic by presenting and leading a discussion on the background for your grant proposal (maximum 20 minutes, including questions). You should select a relevant journal article for the rest of the class to read; you can assume they have read it when you present. This might be the review paper you used as a jumping off point or it could be a different relevant journal article. The discussion can use this article as a focus, but you are not limited to it in your presentation or discussion.
      i) Research Groups: 1,2=Nov12; 3,4=Nov19; 5,6=Nov26
      ii) Note: You should have already provided the full reference and McMaster permalink for the paper you will be discussing by posting to the Avenue discussion board under your Group’s reading topic by November 1st at the latest.
   b) Part Two: on Thursday, your group will give a 20-minute presentation of your research proposal followed by 20 minutes of discussion. Each group member should be prepared to answer questions from the audience about the validity and feasibility of their grant proposal.
      i) Research Groups: 1,2=Nov15; 3,4=Nov22; 5,6=Nov29
   c) When your group is not presenting, you are responsible for coming prepared to critically evaluate the other student groups. Be prepared with questions.

Research Proposal: Peer review (15%): This is an individual assignment in which you will critique both written and oral parts of the research proposal presented by another group. Students will gain experience evaluating the scientific thinking and writing of their peers—a task that all scientists must perform.

1) Examples of the sorts of things you might look for include (but are not limited to): What are the strengths and weaknesses of the grant proposal? Does the proposal provide an adequate background review and rationale for conducting the study? Is the proposal novel? Are the proposed experiments logical and feasible? Are there obvious experiments that have not been proposed? Are there flaws in the design of the experiments? Is the proposed research both interesting and important? Did the authors adequately describe their methods and experiments for you to evaluate the significance of the work? Should the proposal receive funding?

2) Do not wait until the week it is due to work on this. Prepare your review of the written research proposal well in advance so that you only have to add details about the oral presentation and adjust any final conclusions based on the oral defense.
   a) Submit your peer review in your dropbox folder on Avenue before class on your assigned day. It must be in Word format (not PDF) with a “doc” or “docx” extension, not more than 1200 words, 12 pt font, double spaced, 1 inch margins all around. It should cover both the written proposal (approximately 75%) and the oral presentation (approximately 25%).
      i) PeerReview Groups: 1,2=Nov19; 3,4=Nov26; 5,6=Dec3
**Logistics & Grading.** The following weights will be used to compute a total score for each student. McMaster University reserves the right to change course dates, course assignments and their grading weights, and course deadlines in case of an emergency, labor disruption, civil unrest/disobedience, etc.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Range of Due dates</th>
<th>Grade based on</th>
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</thead>
<tbody>
<tr>
<td>10% Reading Assignment: Critique</td>
<td>Sept 20 – Oct 4</td>
<td>Individual performance</td>
</tr>
<tr>
<td>5% Reading Assignment: Critique Peer Review</td>
<td>Oct 11</td>
<td>Individual performance</td>
</tr>
<tr>
<td>5% Research Proposal: Progress Report</td>
<td>Oct 22</td>
<td>Group performance</td>
</tr>
<tr>
<td>20% Research Proposal</td>
<td>Nov 8</td>
<td>Group and individual performance; peer evaluations</td>
</tr>
<tr>
<td>20% Research Proposal: Oral Presentation</td>
<td>Nov 12 – Dec 3</td>
<td>Group and individual performance; peer evaluations</td>
</tr>
<tr>
<td>15% Research Proposal: Peer Review</td>
<td>Nov 19 – Dec 3</td>
<td>Individual performance</td>
</tr>
<tr>
<td>25% Attendance; class participation (in class and on Avenue discussion board); intellectual contribution to class and groups; self evaluations, peer evaluations, instructor evaluations</td>
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Your total score will be translated into a letter grade using the following general competency guidelines:

- A... has attained a high level of competency in all areas of the subject matter. This level of competency would allow the student to complete excellent projects in other areas of inquiry. This would be recognized by any instructor or member of the student’s peer group.

- B... has attained a high level of competency in most (but not all) areas of the subject matter, or has attained a moderate level of competency in all areas. This level of competency would allow the student to complete above average projects in other areas of inquiry. The student is aware of some areas of weakness, has shown improvement in those areas, and has developed strategies for minimizing or eliminating them.

- C... has attained a moderate level of competency in most (but not all) areas of the subject matter, or has attained a low level of competency in some areas. This level of competency would allow the student to complete average (satisfactory) projects in other areas of inquiry. The student recognizes multiple areas of weakness, and has discussed a plan of action to deal with the concerns.

- D... has attained a low level of competency in all areas of the subject matter. This level of competency would allow the student to complete below average projects in other areas of inquiry. This would be recognized by any instructor.

- F... has attained no competency in all areas of the subject matter.
**Academic Integrity:**
You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at [http://www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity).

The following illustrates only three forms of academic dishonesty:
1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.