### Overview

This course will introduce undergraduates and beginning graduate students to the topic of affective neuroscience. The course will explore contemporary approaches to research on emotional processes and the systems in the brain that implement emotional behavior in health and disorder. Special attention will be given to brain-based explanatory models of emotions that are informed by both human and animal research. Related affective processes such as emotional decision making, emotional control, and the interaction of cognition and emotion will also be covered. Class discussions will emphasize the need to think critically about emotional behavior and subjective feelings as they relate to activity in various parts of the brain. Finally, the course will cover potential implications of affective neuroscience findings for such larger philosophical issues as free-will, morality and personal responsibility, and theories of consciousness. The format of the course will be a combination of didactic presentations and in-class discussions.

### Objectives

By the end of this course, you should be able to (a) discuss biological theories of emotion, (b) discuss your understanding of how we think about the relationships between brain activity and observed emotional behavior, and (c) write a research paper on a topic of interest to you within this framework.

### Prerequisite

Biological Psychology (3061 or 5061, or equivalent) or instructor approval.

### Grading

This course is worth 3 semester credits. Final grades will be weighted as follows:

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<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Class Attendance/Participation/Pop-cards:</td>
<td>15%</td>
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<tr>
<td>Midcourse Exam:</td>
<td>30%</td>
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<tr>
<td>Paper:</td>
<td>25%</td>
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<tr>
<td>Final Exam:</td>
<td>30%</td>
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Regular class attendance and participation in class discussions are expected. Material will be presented in class that is not necessarily represented in the text or readings, for which you will be responsible. Also, some material that is covered in the text and assigned readings will not be discussed in class, but you will be responsible for this material. Each exam will cover half of the course material, although the final exam will necessarily incorporate concepts and data covered in the first half of the course. Exams will include multiple choice, short answer and/or essay questions. The format will be announced in the weeks preceding each exam to guide you in your studying.
Pop-cards are an alternative to quizzes on reading material and invite students to freely relay what was important from a given reading. Students should come to every class prepared to describe the central ideas and importance of the reading materials assigned for that class. 1-6 pop cards will be assigned over the course of the semester, and their individual value will depend on the final number assigned.

**Readings:**
- **Required:** Articles on the reading list preceded by an * are required. All others are optional. All readings may be obtained through the U of MN library website, [http://www.lib.umn.edu](http://www.lib.umn.edu), and clicking on the “Journal” tab, enter the name of the journal, and navigate to the right volume and pages of the desired article. You may need to enter your university username and password before retrieving the article if you are on an off-campus computer.

**Important Dates:**
- Feb 28 - News media assignment due
- March 1 - Title & one paragraph description of your paper is due
- March 8 - Midterm exam
- May 1 - Papers are due
- May 8 - Final exam

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**Course Schedule**

<table>
<thead>
<tr>
<th>Dates</th>
<th>Topic</th>
<th>Reading Assignments</th>
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<tbody>
<tr>
<td><strong>SECTION ONE: What are Emotions? How are they Conceived from a Neuroscience Perspective?</strong></td>
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<tr>
<td>Jan 17</td>
<td>A brief history of emotions: From humors, to devils, to behaviors, to brains</td>
<td>Rolls Ch. 1, 2</td>
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<tr>
<td>Jan 19</td>
<td>Basic concepts</td>
<td>Rolls Ch. 3</td>
</tr>
<tr>
<td>Jan 24, 26</td>
<td>The function of emotions within an “input-output”</td>
<td></td>
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<tr>
<td></td>
<td>model of the brain</td>
<td></td>
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<tr>
<td>Jan 31</td>
<td>Brain substrates of emotion</td>
<td>Rolls Ch. 4</td>
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SECTION TWO: Brain Systems in Negative Emotion

Feb 2, 7, 9    Fear and anxiety


Feb 14, 16    Stress and related hormonal systems


Feb 21, 23, 28    Anger and aggression

Assignment: On 2/28, bring in an example from the media (news story, magazine article, etc.) of an instance of human aggressive behavior. Also turn in your own summary and discussion of the article, in terms of the type of aggression represented, and the emotion/brain systems that might have been involved (no more than 1 double spaced page). Also be prepared to discuss the article in class. This assignment will count toward the class participation contribution to your grade.


March 1, 6    Motivational deficits: Anhedonia and depression

Paper topics and a one-paragraph description of the paper's goals due at the end of class on 3/1.


**March 8**    Midcourse Exam: Covers all material presented to date.

**March 13, 15**    No class (semester break)

**SECTION THREE: Brain Systems in Positive “Approach” Emotion**

**March 20, 22**    Approach and anticipation of reward    Rolls Ch.7


**March 27**    Energy: Food intake and regulation    Rolls Ch. 5, 6

**March 29**    Dysregulated approach behavior: substance abuse    Rolls Ch. 8


**April 3, 5**    Love, bonding, and sexuality    Rolls Ch. 9


**SECTION FOUR: Additional Assorted Topics**

**April 10, 12  Emotions and decision making**


**April 17, 19  Brain systems for the regulation of emotion**


**April 24, 26  The interplay of emotion and cognition**


May 1, 3 Consciousness, neuro-determinism and other philosophical issues related to affective neuroscience

Research paper is due on May 1.


May 8 Final Exam from 4pm-6pm in Folwell Hall, Room 116.
Covers all material presented since the midcourse exam plus the basic concepts introduced in the first half of the course.

Paper Requirement

Final papers are due on May 1, 2008 at the end of the class period. Papers must be submitted in hard copy format. No diskettes or emailed submissions will be accepted. Papers must be written in APA (American Psychological Association) format. Graduate students must write a paper that is 12-15 pages long (double spaced), excluding references. Undergraduate students must write a paper that is 6-8 pages long, excluding references. Please adhere to these requirements regarding the length of papers. Paper topics and a detailed outline, due on March 1st, must be approved by the instructor or TA. The final version must be submitted on May 1. Five points will be subtracted for each day that the paper is late.

Frequently asked questions:

What is a research paper?

A research paper is a literature review of a general topic area. It is designed to present either a surveying of an area of interest (for example, “the role of the ventromedial prefrontal cortex in aggression”) or a theory regarding some area of interest (for example, “is the role of the amygdala in emotional processing specific to negative emotion?”). A review paper of this type is NOT an actual empirical study nor is it a study proposal. Once you have presented findings related to your topic, it is customary to include a section that is evaluative or critical in nature (that is, what are the strengths and weaknesses of the findings that you have articulated?). You can also make suggestions for future research.
What is APA format?

APA format is a style of writing, organization, and referencing that is required by the American Psychological Association. If you are not familiar with this approach, consult the 6th Edition of the Publication Manual of the American Psychological Association. The writing of review papers is different from the writing of empirical papers, but there are guidelines in the manual that should be familiar to most psychology students. You will receive a very brief refresher on this approach on April 13th.

How many references should I include in my paper?

That question is difficult to answer, because it will depend on your topic and general approach. However, at least 8-10 citations for undergraduate papers and 12-15 citations for graduate papers should be provided to demonstrate that you adequately researched your topic.

What is considered a reference?

You should consult journal articles, books, or book chapters. These must be obtained from the library or from journals that provide their articles in electronic format. For journal articles, it is not sufficient to read an abstract. In order to accurately cite the article’s contents, you need to have read the actual paper. Internet searches that refer you to non-peer reviewed sites or articles are not appropriate sources for a research paper at this level of training.

What is plagiarism?

Plagiarism is using someone else’s work without proper citation and/or claiming it as your own. One of the hardest aspects of writing a research paper is to properly reference the ideas that are in it. If you have questions about what constitutes plagiarism, ask.

Additional Information

A-F grading will be based on U of MN senate policy. Plus/minus grades will be used.

A-range= achievement that is outstanding relative to the level necessary to meet course requirements; 90% or better
B-range= achievement that is significantly above the level necessary to meet course requirements; 80-89%
C-range= achievement that meets the course requirements in every respect; 70-79%
D-range= achievement that is worthy of credit even though it fails to meet fully the course requirements; 60-69%
F= achievement that is not worthy of credit; below 60%
S= achievement that is satisfactory, which is equivalent to a C- or better; 70% or higher

Percentages for the above scheme will reflect the average of the highest three grades on each exam. The instructor reserves the right to adjust the grade distribution if such an adjustment will improve final grades for a majority of students in the course (for example, if the average grade in the course is low and no one scores in the highest range). In no case will such an adjustment make your individual grade worse than what is described above.
Make-Up Exams: Make-up exams will be allowed only in cases of illness, other verified emergency situations or other situations that are sanctioned by U of MN policy (e.g., participation in intercollegiate athletic events, subpoenas, jury duty, military service, and religious observances). Students are responsible for providing documentation to the instructor to verify the reason for the absence. Make-up exams will not be allowed to accommodate travel or other personal plans, so please use the schedule below to plan accordingly. If there is a verifiable emergency that limits your ability to take a scheduled exam, please contact the instructor immediately.

Evaluation of Graduate vs. Undergraduate Students

The reading load will be the same for graduate and undergraduate students, as will the exam requirements. Graduate students are expected to write a longer paper than undergraduates (see below) and will be evaluated more stringently in terms of (a) the sophistication of thinking and (b) the quality of the literature review.

Extra Credit: Final grades are non-negotiable. There will be no opportunities for extra credit. Please do your best on the paper and exams.

Students with Disabilities: If you have any questions regarding disability or reasonable accommodations, make Disability Services your first point of contact. After you make contact with them, Disability Services will contact the instructor to discuss how to best accommodate your needs. The contact information is:

Disability Services, 180 Gateway -- 200 Oak Street SE, University of Minnesota, Minneapolis, MN 55455 (612) 624-4037 (V/TTY)

Student Academic Integrity and Scholastic Dishonesty: All students enrolled in University courses are expected to complete course requirements with fairness and honesty. Failure to do so by seeking unfair advantage over others or by misrepresenting someone else’s work as your own can result in disciplinary action. The University of Minnesota’s Student Conduct Code defines scholastic dishonesty as: submission of false records of academic achievement; cheating on assignments or examinations; plagiarizing; altering, forging, or misusing a University academic record; taking, acquiring, or using test materials without faculty permission; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement. Instructors are obligated to report suspected academic misconduct to their department. Within this course, a student who engages in scholastic dishonesty will be assigned a penalty up to and including an “F” or an “N” for the course. If you have questions regarding the expectations for the paper or for either of the exams, please ask.

University of Minnesota Policy on Sexual Harassment. Sexual harassment by or toward a member of the University community is prohibited. "Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature when (1) submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment or academic advancement in any University activity or program; (2) submission to or rejection of such conduct by an individual is used as the basis for employment decision or academic decisions affecting this individual in any University activity or program; or (3) such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. "Member of the University community" or "University member" mean's any University of Minnesota faculty member, student, or staff member, or other individual engaged in any University activity or program. Department heads, deans, provosts, chancellors, vice presidents, and other supervisors and managers must take timely and appropriate action when they know or should know of the existence of sexual harassment. Other persons who suspect sexual harassment should report it to an appropriate person in their unit or to the University equal opportunity officer. A violation of this policy may lead to disciplinary action up to and including termination of employment or academic dismissal.