San José State University
Department of Psychology
PSYC 121e, Advanced Research Methods: Psychophysiology Lab
Fall 2019

BASIC COURSE INFORMATION

Instructor: Valerie Carr
Office Location: Dudley Moorhead Hall (DMH), Room 318
Telephone: (408) 924-5630
Email: valerie.carr@sjsu.edu
Office Hours: Tues/Thurs, 2:00-3:00pm, and by appointment
Class Days/Time: Lecture (sec 40): Wed, 12:00-1:00pm; Lab (sec 41): Wed, 1:15-4:15pm
Classroom: Dudley Moorhead Hall (DMH), Room 236
Prerequisites: (a) Either PSYC 118 or PSYC 120, and (b) PSYC 129

COURSE DESCRIPTION

Psychophysiology is an interdisciplinary field examining the relationship between psychological and physiological processes with an emphasis on the nervous system. In this course, we will primarily focus on research methods relevant to cognitive neuroscience, which aims to understand how the human brain produces thoughts, emotions, and behavior. Methods typically used in cognitive neuroscience include behavioral approaches (e.g., stimulus detection, reaction time, accuracy), neuropsychology (i.e., assessing cognitive deficits following brain damage), physiology (e.g., heart rate, eye tracking, hormone release), and neuroimaging (e.g., CT, PET, MRI, etc.). Through this class you will not only be introduced to these approaches, but you will also have the opportunity to directly gain experience with various forms of data collection and analysis. From the course catalog: “Intensive experiential introduction to applied laboratory work in human psychophysiology and hormonal influences on human behavior. Focus on experimental methodology.”

COURSE FORMAT

The primary purpose of this class is to engage students in psychophysiology research. As such, we will begin each class session with a one-hour lecture followed by a three-hour laboratory (with breaks!). Lectures will provide a background in the foundations of cognitive neuroscience research methods and experimental design, as well as neuroanatomy, neuroimaging data collection, and neuroimaging data analysis. During laboratory sessions you will gain hands-on experience with building a computerized psychological task, learning to write an IRB protocol inclusive of MRI safety concerns, reviewing neuroanatomy via augmented and virtual reality, and analyzing functional MRI data. In the latter portion of the semester, you will work in a group to conduct a functional MRI meta-analysis on a topic of your choosing, and you will report the results in both written and oral formats.
Regular attendance is critical in any class, but it is particularly necessary in this course given that you will be using special software installed in the computer lab in each lab session. Additionally, because many of these research methods will be new to you, being proactive about seeking help is also extremely important in achieving a successful outcome. Please ask questions when you don’t understand information in lecture or in lab – asking questions and offering ideas is welcomed and encouraged!

COURSE WEBPAGE

Course materials such as the syllabus, assignments and quizzes, announcements, grades, etc. can be found on the Canvas learning management system course website at http://sjsu.instructure.com. You are responsible for regularly checking Canvas to learn of any updates.

COURSE LEARNING OUTCOMES (CLO)

Upon successful completion of this course, students will be able to:

- **Content goals**
  - CLO1: Demonstrate knowledge of common psychophysiological research methods
  - CLO2: Identify the unique risks associated with human psychophysiological research
  - CLO3: Perform single-subject and group-level functional MRI data analysis
  - CLO4: Use a neuroinformatics approach to answer psychophysiological research questions
  - CLO5: Conduct a functional MRI meta-analysis
  - Content goals will be assessed via quizzes and lab reports

- **Critical thinking and communication goals**
  - CLO5: Write a report regarding meta-analytic findings in APA style
  - CLO6: Give a professional oral presentation of meta-analytic findings

PROGRAM LEARNING OUTCOMES (PLO)

Upon successful completion of the psychology major requirements, students will be able to:

- **Knowledge Base of Psychology**
  - PLO1: Demonstrate familiarity with the major concepts, theoretical perspectives, empirical findings, and historical trends in psychology.

- **Research Methods in Psychology**
  - PLO2: Design, implement, and communicate basic research methods in psychology, including research design, data analysis, and interpretations.

- **Critical Thinking Skills in Psychology**
  - PLO3: Use critical and creative thinking, skeptical inquiry, and a scientific approach to address issues related to behavior and mental processes.

- **Application of Psychology**
  - PLO4: Apply psychological principles to individual, interpersonal, group, and societal issues.

- **Values in Psychology**
  - PLO5: Value empirical evidence, tolerate ambiguity, act ethically, and recognize their role and responsibility as a member of society.
REQUIRED TEXTS/READINGS


Additional readings will be provided as freely-available online resources as well as PDFs posted on Canvas.

COURSE REQUIREMENTS AND ASSIGNMENTS

During this course, you will be required to participate in class and to complete the following: lab reports, quizzes, and a final project. See details below regarding each type of assignment, including the final exam, in “Grading Policy” and “Schedule”.

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Please review the following sources and policies, as well:
- Office of Graduate and Undergraduate Programs’ Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/

GRADING INFORMATION

Letter grades

Grades will be based on participation (5%), lab reports (25%), quizzes (20%), and a final project (50%). Letter grades will be assigned as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>97.00 – 100.00</td>
</tr>
<tr>
<td>A</td>
<td>93.00 – 96.99</td>
</tr>
<tr>
<td>A-</td>
<td>90.00 – 92.99</td>
</tr>
<tr>
<td>B+</td>
<td>87.00 – 89.99</td>
</tr>
<tr>
<td>B</td>
<td>83.00 – 86.99</td>
</tr>
<tr>
<td>B-</td>
<td>80.00 – 82.99</td>
</tr>
<tr>
<td>C+</td>
<td>77.00 – 79.99</td>
</tr>
<tr>
<td>C</td>
<td>73.00 – 76.99</td>
</tr>
<tr>
<td>C-</td>
<td>70.00 – 72.99</td>
</tr>
<tr>
<td>D+</td>
<td>67.00 – 69.99</td>
</tr>
<tr>
<td>D</td>
<td>63.00 – 66.99</td>
</tr>
<tr>
<td>D-</td>
<td>60.00 – 62.99</td>
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<tr>
<td>F</td>
<td>0.00 – 59.99</td>
</tr>
</tbody>
</table>

Weighting of graded assignments

Participation (5%)

Given the laboratory-intensive nature of this course, it is critical that you consistently participate in all aspects of the class. The participation grade will be based on several factors: (a) Participation in lab activities and exercises. Grading will be based on your thoroughness and timeliness in completing these activities. (b) Active participation in class discussions. Grading will be based on your speaking up with relevant contributions during lecture and lab. (c) Participation/contribution to your group research project. Grading includes participating in group project work and utilizing the time constructively.

As per the University Attendance and Participation Policy F15-12 at http://www.sjsu.edu/senate/docs/F15-12.pdf, “Students should attend all meetings of their classes, not only because they are responsible for
material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

Lab reports (25%)
During the lab portion of each class session, you will perform a variety of activities giving you hands-on experience with psychophysiological research. After performing each day’s activity, you will complete a written assignment about it (details about the content of a given lab report will be provided during the relevant lab activity). Because each lab report requires participation in the associated lab activity, attendance is critical. In other words, if you are absent for a given lab activity, you cannot receive credit for the associated lab report, except in emergency situations in which documentation is provided by an independent authority (e.g., a doctor’s note). However, your lowest lab report score will be dropped, allowing for a degree of flexibility in dealing with an unanticipated absence. Note: If you miss a lab activity, you may be responsible for completing data analysis outside of class given that many of the activities you’ll perform build on each other. Lab reports will be turned in by each student individually via Canvas.

Quizzes (20%)
There will be two in-class quizzes that cover lecture and reading materials. Given the technical nature of the course, the quizzes will be open book/notes. However, the quizzes will be time-limited, meaning that studying is still necessary to perform well! Please note that no makeup quizzes will be given except in emergency situations in which documentation is provided by an independent authority (e.g., a doctor’s note).

Final project (50% total)
In small groups, you will conduct a functional MRI meta-analysis on a topic of your choosing. This project will be broken down into smaller steps as follows, each of which will be described in more detail as the semester progresses:

Group submission (i.e., one submission per group)
- List of references: 5%
- List of coordinates: 5%
- Cluster results file: 5%
- Oral presentation: 10%

Independent submission (i.e., each student writes their own paper)
- Final paper: 25%

Submitting assignments
All assignments are due by the beginning of lecture (i.e., at noon) on the specified due date unless otherwise stated. If you know in advance that you will be traveling and unable to submit an assignment on the due date, you must submit it in advance of the due date. No late assignments will be accepted. However, partial credit will be given for late final papers as follows: For each 24-hr period your paper is late, your score will drop 10%. I.e., if you submit your paper three hours late (within the first 24-hr period), your grade will drop by 10%; if you submit it 27 hours late (within the second 24-hr period), it will drop by 20%, and so on.

With the exception of in-class quizzes, all assignments will be submitted via Canvas. It is your responsibility to ensure that submitted files are properly uploaded and complete by the due date. As such, blank/incomplete/corrupt files will not be accepted, similar to how a blank piece of paper would never be accepted in class. I suggest beginning the submission process at least 30 mins in advance of each deadline to ensure sufficient time to correctly upload your files and address any Canvas-related difficulties.
Academic integrity

Cheating, plagiarism, or other forms of academic dishonesty that are intended to gain unfair academic advantage will not be tolerated. Note: this policy includes final papers! I.e., even though you will work as a group to conduct a meta-analysis, it is your responsibility to independently write your own paper; plagiarism among group members will not be tolerated. If evidence of academic misconduct is found, you will receive a zero on the assignment(s) in question, and I will file a report with the Office of Student Conduct & Ethical Development. See the office’s website for more information at http://www.sjsu.edu/studentconduct/policies/.

Viewing grades

Grades will be posted on Canvas in a timely manner. Note that “All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades.” See University Policy F13-1 at http://www.sjsu.edu/senate/docs/F13-1.pdf for more details.

CLASSROOM PROTOCOL

Students are expected to maintain a level of professional and courteous behavior at all times. You are required to silence your phones before the beginning of class. Computers are to be used for note-taking and lab activities only. I expect you to be respectful of your fellow classmates such that you do not distract them by browsing the internet or chatting online during class. Students not abiding by these policies will be asked to leave the room.

DIVERSITY STATEMENT

It is my goal to create a safe and diversity-sensitive learning environment that respects the rights, dignity, and welfare of all students, faculty, and staff. Diversity means the fair representation of all groups of individuals, the inclusion of minority perspectives and voices, and appreciation of different cultural and socioeconomic group practices.

UNIVERSITY POLICIES

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/.
# COURSE SCHEDULE

Note: The schedule is subject to modification (with fair warning) as the instructor deems necessary.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assignment due</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 21</td>
<td>Intro to psychophys methods</td>
<td>[none]</td>
<td>Newman, Ch1</td>
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<tr>
<td>Aug 28</td>
<td>Experimental design; PsychoPy</td>
<td>[none]</td>
<td>Newman, Ch2; Pierce, Ch2</td>
</tr>
<tr>
<td>Sep 4</td>
<td>Neuroimaging overview; MRI safety and the IRB</td>
<td>Lab report 1</td>
<td>Ward, Ch4, p49-65; Huettel, Ch2</td>
</tr>
<tr>
<td>Sep 11</td>
<td>Neuroanatomy for neuroimagers; augmented and virtual reality</td>
<td>Lab report 2</td>
<td>Revisit neuro textbook of choice</td>
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<tr>
<td>Sep 18</td>
<td>fMRI overview</td>
<td>Lab report 3</td>
<td>Ward, Ch4, p65-77; Newman, Ch8, p256-276; ABB* tutorials 1-3</td>
</tr>
<tr>
<td>Sep 25</td>
<td>Quiz 1; fMRI pre-processing</td>
<td>Lab report 4</td>
<td>Poldrack, Ch3-4; Huettel, Ch8, p295-319; ABB* tutorial 5</td>
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<tr>
<td>Oct 2</td>
<td>fMRI single-subject analysis</td>
<td>Lab report 5</td>
<td>Poldrack, Ch5; Huettel, Ch10, p363-396; ABB* tutorials 5-6</td>
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<tr>
<td>Oct 2</td>
<td>fMRI group analysis</td>
<td>Lab report 6</td>
<td>Poldrack, Ch6; Huettel, Ch10, 397-409; ABB* tutorial 7</td>
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<td>Oct 9</td>
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<td>Lab report 7</td>
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<td>Oct 16</td>
<td>Neuroinformatics</td>
<td>Lab report 8</td>
<td>GingerALE user’s manual</td>
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<tr>
<td>Oct 30</td>
<td>Quiz 2; Group project overview, choosing topics</td>
<td>Lab report 9</td>
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<tr>
<td>Nov 6</td>
<td>Group project: read papers and extract coordinates</td>
<td>References file</td>
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<tr>
<td>Nov 13</td>
<td>Group project: run meta-analysis</td>
<td>Coordinates file</td>
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<tr>
<td>Nov 20</td>
<td>Group project: interpret findings</td>
<td>Cluster file</td>
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<tr>
<td>Nov 27</td>
<td>No class <em>(Thanksgiving)</em></td>
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<tr>
<td>Dec 4</td>
<td>Group project: work on oral presentation</td>
<td>[none]</td>
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<tr>
<td>Dec 16</td>
<td>Final project, 9:45am-12:00pm</td>
<td>Paper, presentation</td>
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