Attention!

This is a representative syllabus.

The syllabus for the course when you enroll may be different.

Use the syllabus provided by your instructor for the most up-to-date information. Please refer to your instructor for more information for the specific requirements for a given semester.

Feel free to contact the Psychology Advising Office for any questions regarding psychology courses either by email (psychadvising@osu.edu) or phone (614.292.5750).

Thank you!
Syllabus
Introduction to Mathematical Psychology

Readings:
Listed below and will be provided on Carmen.

Course Description:
This course will give students familiarity with mathematical reasoning and modeling in psychology. We will focus on some of the best applications of mathematics to psychology and discuss what made them successful. We will also cover issues of measurement (which go hand-in-hand with models). Topics will include scaling, psychophysics, signal detection, probabilistic choice, decision making, response selection, and model comparison. At the end of the course, students will have a broad overview of how psychologists use mathematics in building theories and how mathematical models can provide insight about human behavior.

Tasks:
Exams (50%): There will be two exams, one in Week 5 and one in Week 14, each worth 25% of the final grade. Both exams will be take-home exams, with a time frame for completion of 24 hours for the first exam and 48 hours for the second. Exams will be electronically distributed, and will be submitted through the Dropbox function in Carmen. The purpose of the exams is to test comprehension of the material as well as the ability of the student to use the tools provided in class on hypothetical problems. As a result of the layout of the course, the first exam will be primarily essay based, whereas the second exam is primarily application based. Students are not allowed to collaborate in any way for either exam.

Homework (20%): There will be a total of four homework assignments each worth 5% of the total grade. The homework assignments are meant to test understanding of the course material by applying principles discussed in class to new problems. Students may work on the assignments together in (small) groups. However, be warned that some portion of the exams build on exercises carried out in the homework, and so independent knowledge of the homework material will be assessed eventually. As a result of the layout of the course, homeworks are not evenly distributed.

Term project (30%): The most important component of the grade is the term project. The goal of the term project is to allow students the opportunity to pursue research questions centered on a topic from the course. Teams will be determined later in the semester based on a few factors, such as number of students enrolled. Once teams have been determined, the team will decide on a topic of interest to base the project on, and then meet with the
Instructor to determine the project’s suitability. From there, the team will prepare two elements: an in-class presentation and a term paper.

- **In-class presentation (10%)**: The presentations will occur on the last week of the course, with the length of the talks determined by the number of teams. The presentations should succinctly summarize the background, importance, scope, and discoveries of the project. There are no rules regulating which team member(s) should complete the presentation.

- **Term paper (20%)**: The term paper is due by the end of the regularly scheduled final exam for the course (see below). The paper should adhere to basic formatting rules, and should be double-spaced, between 10-20 pages, contain the names of the authors on the first line, and the title of the project on the second line. The text beginning the introduction of the project should appear on the third line. Finally, there are no rules regulating which team member(s) should complete the paper.

Course grades will be determined as follows:

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<tr>
<th>Grade Range</th>
<th>Letter Grade</th>
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<tr>
<td>93-100%</td>
<td>A</td>
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<td>90-92.99%</td>
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<td>83-86.99%</td>
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<td>77-79.99%</td>
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<td>63-66.99%</td>
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Class attendance policy:
Attendance is not mandatory. HOWEVER, people who come to class do better. This is a graduate level course, and it will be both time consuming and difficult. The lectures are an integral component of the learning process and will help you greatly on the homeworks, exams, and generally understanding the material. That said, we are all (busy) adults and if you need to miss a class, I understand.

Sexual misconduct policy:
Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu

Academic Integrity:
CHEATING AND PLAGIARISM WILL NOT BE TOLERATED AND WILL BE REPORTED TO THE COMMITTEE ON ACADEMIC MISCONDUCT. IGNORANCE IS NOT AN EXCUSE!
It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at http://studentconduct.osu.edu

Please be aware that every assignment you turn in on Carmen will be compared via advanced software to a vast database of past assignments and those of your current peers. If you plagiarize, the detection software will alert me! See example from Class 1 lecture slides.

Missed Classes:
If you miss a class, please contact fellow students for relevant notes and handouts. The instructor or course assistants are available to meet with you after you have reviewed the notes and readings to answer additional questions. It will help to get the contact info of some fellow students.

Disability Services:
The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information:** slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Cell Phones and Electronic Devices in Class:
An increasing amount of research has pointed to negative cognitive effects of excessive electronic device use, something that will likely come up in class. Many of us find it hard to resist texting or even surfing the web during class. And there is evidence that it dramatically worsens performance for you and your neighbors (see lecture slides from Class 1).

With all of this in mind, I have established the following policies:

1. If you bring a laptop to class, it can be used only to take notes. Do not use it for web surfing or engaging in social media. Students found to be surfing the web or otherwise using their computers in a manner that is distracting to their classmates will be asked to close their laptops. If a student continues this inappropriate laptop use, he/she will be asked to leave the classroom.
2. If students need to text or make a phone call, please excuse yourself from the classroom.
Policy on Democratic Learning Environment:
I believe that academic systems work best when they serve the needs of the students. As such, there will be some occasions where we will vote to make minor changes to the syllabus, such as dedicating class time to review for an exam, modifying the submission times for homeworks, or frequency of email alerts from professor to students. The goal of this process is to ensure that the majority of the class is satisfied with the course structure. If a modification to the syllabus is made, a new syllabus will be posted on that day, and it will be announced during the course announcements period of the following class.

Class Schedule (subject to change):

Week 1: The Purpose and Place of Cognitive Models
Tuesday, 1/10: Welcome/introduction/syllabus
Thursday, 1/12: Introduction to Mathematical Modeling
  • Fum, D., Del Missier, F., & Stocco, A. (2007). The cognitive modeling of human behavior: Why a model is (sometimes) better than 10,000 words. Cognitive Systems Research, 8, 135-142

Week 2: Statistics Primer
Tuesday, 1/17: Maximum Likelihood Estimate
Thursday, 1/19: Bayesian Statistics and Simulation Methods

Week 3: Psychophysical Scaling
Tuesday, 1/24: Scaling
Thursday, 1/26: Measurement

Week 4: Good Practices in Cognitive Modeling
Tuesday, 1/31: Model Fit

Thursday, 2/2: Some Good Practices

Week 5: Signal Detection Theory
Thursday, 2/9: Signal Detection Theory

Week 6: Perceptual Decision Making
Tuesday, 2/14: DDM, LCA

Thursday, 2/16: LBA and Model Falsifiability?

Week 7: Models of Preference
Tuesday, 2/21: Risky Choice

Thursday, 2/23: Context preference reversal

Week 8: Models of Memory
Tuesday, 2/28: High threshold model, REM

Thursday, 3/2: BCDMEM, and Comparing the Models

Week 9: Context and Instance Theories
Tuesday, 3/7: Context theories

Thursday, 3/9: Instance theories

Week 10:
Tuesday, 3/14: Spring break – no class
Thursday, 3/16: Spring break – no class

Week 11: Cognitive Architectures
Tuesday, 3/21: Connectionist Models

Thursday, 3/23: ACT-R

Week 12: Bayesian Models of Cognition
Tuesday, 3/28: Bayesian models of cognition
Thursday, 3/30: The future of Bayesian cognitive models

Week 13: Model-based Cognitive Neuroscience
Tuesday, 4/4: Approaches of analysis
Thursday, 4/6: Some Examples

Week 14: Wrapping Up the Course
Thursday, 4/13: Open day for projects

Week 15: Presentation Week
Tuesday, 4/18: Student presentations
Thursday, 4/20: Student presentations
This cannot be rescheduled.