Learning Objectives
In completing the online labs, you will:

1. Understand how research findings relate to theoretical concepts in cognition.
2. Develop your scientific research, data visualization, digital literacy, and written communication skills, which are important abilities to have in university and are highly valued by employers.
3. Engage in a unique experiential learning activity that is beyond the scope of the lectures.

Requirements
Each online lab must be submitted online using eClass. Use complete sentences; do not use point form. It is your responsibility to ensure that your lab has been properly submitted. You should receive a confirmation email from eClass as soon as your submission is successful. Labs submitted without appropriate data (when required) will be considered incomplete, and will be penalized for lateness if not submitted with data on time.

Marks
Each lab consists of an interactive cognition experiment, done on your own time. Depending on the lab, you must include a graph, table, or other data (e.g., a screenshot) of your results, and answer a number of questions for marks. Marks are assigned based on the completeness, relevance, and specificity of your answers. If your answer is incomplete, irrelevant, vague, or is lacking detail, marks will be deducted. Partial marks are assigned at the discretion of the teaching assistant.

You do not need to find or reference any external sources in your lab. However, you are expected to read relevant sections of the textbook for background information before doing a lab.

Deadlines & Late Policy
Each lab must be submitted by the end of class time (not at midnight) on the day in which it is due, or it will be considered late. Late labs will lose 1 mark per 24-hour period, starting immediately after class is over. That is, if you submit your lab 1 minute past the deadline, you will lose 1 mark. If you submit your lab 23 hours and 59 minutes past the deadline, you will still lose only 1 mark. But if you submit your lab 24 hours and 1 minute past the deadline, you will lose 2 marks.

If you open, edit, or make any changes to your eClass submission in any way after the deadline, you will receive a late penalty.

Do not email labs to the instructor or the TA. Late (or early) labs may be submitted via eClass. However, after seven days past the deadline, you will no longer be able to submit your lab online. If you have exceptional extenuating circumstances, please contact the instructor.
Alternate Assignment
If you have a compelling reason why you cannot do the online labs, an alternate assignment may be provided. You must make arrangements with the instructor before lab #1 is due.

Technical Support
“Technical problems” will not be accepted as an excuse for a late or incomplete lab. IST eClass Support has Using eClass for Students tutorials, ranging from System Setup to Submitting Assignments. For help with eClass, see IST’s eClass support knowledgebase or contact IST’s eClass support. For other IT problems, contact IST’s helpdesk.

It is strongly recommended that you make backups of your answers to each lab (and your data). “My computer crashed” is not an acceptable excuse for a missing, incomplete, or late lab. Google Docs is your friend.

How To Take a Screenshot
Some labs present a graph or a summary of your data, but do not allow you to access your raw data. In that case, you will be asked to take a screenshot of the results on your device’s screen, and include them in your submission as proof that you completed the lab. These websites will help you take a screenshot:
- take-a-screenshot.org -- has how-tos for Windows, Mac, ChromeOS, Android, iOS, and Linux
- How to take and annotate screenshots on Windows 10 -- instructions for Microsoft Snip & Sketch app
- Use Snipping Tool to capture screenshots -- instructions for the older Windows Snipping Tool
- How to take a screenshot on your Mac -- instructions from Apple Support

How to Make a Graph
Some labs require you to make a graph based on data copied from a web page, or in a CSV spreadsheet file. Here are some instructions:
- Create a chart from start to finish (Microsoft Excel)
- Inserting Charts (LibreOffice Calc)
- Add & edit a chart or graph (Google Sheets)

The Fine Print
The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence.

Academic dishonesty is a serious offence and can result in suspension or expulsion from the University. This resource from Student Conduct and Accountability, and the University of Alberta Libraries can help: Plagiarism (What is plagiarism?). For more, see Academic Misconduct - Don't Do It.
Online Labs

Online Lab #1: Deary-Liewald & Go/No-Go Tasks (7 marks) -- due Monday, May 11

Instructions:
- read chapter 1 of the textbook and the lecture notes on the work of F.C. Donders (1868); also read the introduction to simple and choice reaction time tasks:
  https://www.psytoolkit.org/lessons/simple_choice_rts.html
- go to the web page for part 1 of this lab (called Deary-Liewald task):
  https://www.psytoolkit.org/experiment-library/deary_liewald.html
- read the Introduction, then run the demo
- carefully read the instructions on how to do the demo; it will include some training trials
- take a screenshot of your results; include it in your submission
- next, go to the web page for part 2 of this lab (called Go/No-go task):
  https://www.psytoolkit.org/experiment-library/go-no-go.html
- read the Introduction, then run the demo
- carefully read the instructions on how to do the demo; there are no training trials
- when the experiment is over, click the Show data button to get your raw data
- if you made any errors (pressing the space bar on a no-go trial), run the demo again
- copy your data into a spreadsheet (e.g., Microsoft Excel, LibreOffice Calc, Google Sheets), and calculate the mean of the “go” trials

Data:
- give your reaction times in the simple task, choice task, and go condition of the go/no-go task
- include your screenshot of the Deary-Liewald task

Questions:
  a) What are the independent and dependent variables in the Deary-Liewald task? What are the independent and dependent variables in the go/no-go task? (2 marks)
  b) Which reaction time should be the fastest, which should be the slowest, and why (according to Donders)? What did you actually find? (3 marks)
  c) Calculate your RT for stimulus identification, and your RT for response selection; show your work. (2 marks)
Online Lab #2: Visual Search (8 marks) -- due Tuesday, May 19

Instructions:
- read chapter 4 of the textbook and the lecture notes on attention; also read the introduction to visual search: [https://www.psytoolkit.org/lessons/visualsearch.html](https://www.psytoolkit.org/lessons/visualsearch.html)
- go to the web page for this lab (called Visual search task): [https://www.psytoolkit.org/experiment-library/search.html](https://www.psytoolkit.org/experiment-library/search.html)
- read the Introduction, then run the demo
- carefully read the instructions on how to do the demo
- take a screenshot of your results

Data:
- include a screenshot of your results
- create a line graph of items (X-axis) vs. reaction time (Y-axis); be sure to include titles and units for each axis (3 marks)

Questions:
A) What are the independent and dependent variables in this experiment? (1 mark)
B) Calculate the search slope, using the 5- and 20-items data points (you can use the slope calculator at [https://www.calculator.net/slope-calculator.html](https://www.calculator.net/slope-calculator.html)). What is your search slope? If there were 100 items, what do you predict the reaction time will be (show your work)? (2 marks)
C) This lab used conjunction search. Using a target of an upright orange T, what would a feature search task be like, and why? (That is, what would the distractors be?) What would a spatial configuration search task be like, and why? (2 marks)

Online Lab #3: Numerical Memory (5 marks) -- due Monday, May 25

Instructions:
- note: wear headphones to do this lab; you should do the lab in a quiet location
- read chapter 5 of the textbook and the lecture notes on short-term memory
- go to the APA Online Psychology Laboratory website (you will need to create login credentials): [https://opl.apa.org/OPL-Student/index.html?#/StudentExperiment](https://opl.apa.org/OPL-Student/index.html?#/StudentExperiment)
- click on the Numerical Memory icon and enter the class ID (917908), then click Launch Experiment
- click on the DESCRIPTION tab and read through all of the background information
- click on the EXPERIMENT tab, then click the START button to begin the experiment
- carefully pay attention to the instructions on how to do the experiment; it will include some practice trials
- click the Save Data button, then click the Data icon on the left side, then select Numerical Memory, then select University of Alberta - PSYCO258, and click Get Report

Data:
- the number of items you got in the correct sequence in auditory format and visual format are provided in a spreadsheet (do not submit this with your lab)

Questions:
A) How did you do in each condition? (1 mark)
B) Calculate the mean of your performance across the two conditions. How do you compare to the average capacity of short-term memory? (2 marks)
C) How would the working memory model (Baddeley & Hitch, 1974; Baddeley, 2000) explain any differences in a person’s performance between the auditory and visual conditions? (2 marks)
Online Lab #4: Mental Rotation (9 marks) -- due Monday, June 1

Instructions:
- read chapter 10 of the textbook and the lecture notes on visual imagery; you should also review textbook pages 146-148
- go to the APA Online Psychology Laboratory website (you will need to create login credentials):
  https://opl.apa.org/OPL-Student/index.html?#/StudentExperiment
- click on the Mental Rotation icon and enter the class ID (917908), then click Launch Experiment
- click on the DESCRIPTION tab and read through all of the background information
- click on the EXPERIMENT tab, then click the START button to begin the experiment
- carefully pay attention to the instructions on how to do the experiment; it will include two practice trials
- click the Save Data button, then click the Data icon on the left side, then select Mental Rotation, then select University of Alberta - PSYCO258, and click Get Report
- download your data in Excel (CSV) format
- if you got zero trials correct in any condition, run the experiment again

Data:
- create a line graph of angular difference (X-axis) vs. reaction time (Y-axis); make one curve for “same condition” trials and another curve for “different condition” trials; be sure to include titles and units for each axis (4 marks)

Questions:
a) How did Shepard and Metzler’s (1971) findings suggest that mental images were similar to real objects? (1 mark)
b) Imagine you ran the experiment again, but this time you were also given a set of items to remember before each mental rotation trial, which you had remember right after the trial:
- you hear a sequence of 4 notes, which you have to sing back after the trial
- you are shown a sequence of 4 words, which you have to say back after the trial
- you are shown 4 blocks arranged in a pattern, which you have to recreate after the trial--for example:

   ![Diagram of blocks]

   How do you think your performance would be affected in each of these conditions? Explain why. (3 marks)
c) Your sister is taking a dance class, but she is having problems copying the different moves from the instructor. You ask her if the instructor faces the class or has their back to the students. Why might this make a difference? (1 mark)
Online Lab #5: Fitts’s Law (6 marks) -- due Monday, June 8

Instructions:
- read the chapter in the coursepack on applied cognitive psychology; also read the introduction to Fitts’s Law: https://www.psytoolkit.org/lessons/fitts.html
- go to the web page for this lab (called Fitts’s Law): https://www.psytoolkit.org/experiment-library/fitts.html
- read the Introduction, then run the demo
- carefully read the instructions on how to do the demo
- take a screenshot of the scatterplot of your results, then press the space bar
- click the Show data button to see your raw data
- copy your data into a spreadsheet
- go to the linear regression calculator at: https://www.socscistatistics.com/tests/regression/default.aspx
- copy column 5 of your data (the Fitts calculation) and paste it into the X Values box
- copy column 6 of your data (response time) and paste it to the Y Values box
- then click the Calculate the Regression Equation button
- take a screenshot of the graph that includes the blue regression line and the regression equation (note: you can also copy this image and paste it into paint software)

Data:
- include your screenshot of the scatterplot of your results
- include an image of your scatterplot with the regression line

Questions:
- a) What are the independent and dependent variables in this experiment? (1 mark)
- b) The regression line is a “best fit” through your data; it predicts how changing Fitts’s calculation affects your reaction time. Give your regression equation. If Fitts’s Law predicted your data perfectly, what would the slope (b) be? What would the Y-intercept (a) be? (3 marks)
- c) In this experiment, you moved your mouse pointer to different locations. This is similar to using a Graphical User Interface (GUI) on a computer. If you were a interface designer, how would you design a user interface (e.g., clickable icons, menus, etc.) to best take advantage of Fitts’s Law? (2 marks)
Scoring Rubric

This rubric is intended to provide a general sense of how student answers are differentiated, scored, and resulting marks awarded.

Online Lab #1 (7 marks)
Screenshot of the Deary-Liewald task must be included.
  a) Correct, specific identification of independent and dependent variables for Deary-Liewald task: 1 mark.
     Correct, specific identification of independent and dependent variables for Go/No-Go task: 1 mark.
  b) Correct ordering of three reaction times: 0.5 marks.
     Correct explanation of all three reactions times: 1.5 marks
     Description of results, and relation to prediction: 1 mark.
  c) Correct calculation of two reaction times, including work: 2 marks.

Online Lab #2 (8 marks)
Line graph provided with all required components (X-axis, X-axis label with units; Y-axis, Y-axis label with units; data points/curve): 3 marks.
  a) Correct, specific identification of independent and dependent variables: 1 mark.
  b) Correct calculation of search slope: 1 mark.
     Correct prediction of reaction time for 100 items, including work: 1 mark.
  c) Correct application of concept to example of feature search task, including explanation: 1 mark.
     Correct application of concept to example of spatial configuration search task, including explanation: 1 mark.

Online Lab #3 (5 marks)
  a) Description of results: 1 mark.
  b) Correct calculation of mean: 1 mark.
     Correct application of mean to average capacity of short-term memory: 1 mark.
  c) Correct application of both conditions to working memory model: 2 marks.

Online Lab #4 (9 marks)
Line graph provided with all required components (X-axis, X-axis label with units; Y-axis, Y-axis label with units; data points/two curves): 4 marks.
  a) Correct application of findings to real objects: 1 mark.
  b) Correct prediction of all three conditions, each with explanation: 3 marks.
  c) Correct application of concept to example: 1 mark.

Online Lab #5 (6 marks)
Screenshots of scatterplot of results, and scatterplot with regression line must be included.
  a) Correct, specific identification of independent and dependent variables: 1 mark.
  b) Correct regression equation, including slope and Y-intercept: 1 mark.
     Correct prediction of ideal case of Fitts’s Law: 1 mark.
  c) Correct application of Fitts’s Law to user interface element components: 2 marks.