Syllabus - What you will learn from this course

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WEEK 1

WEEK 1 - OVERVIEW & INFERENCE PROCEDURES

In this first week, we'll review the course syllabus and discover the various concepts and objectives to be mastered in weeks to come. You'll be introduced to inference methods and some of the research questions we'll discuss in the course, as well as an overall framework for making decisions using data, considerations for how you make those decisions, and evaluating errors that you may have made.

On the Python side, we'll review some high level concepts from the first course in this series, Python's statistics landscape, and walk through intermediate level Python concepts. All of the course information on grading, prerequisites, and expectations are on the course syllabus and you can find more information on our Course Resources page.

3 hours to complete

9 videos (Total 67 min), 5 readings, 1 quiz **SEE LESS**

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9 videos

Welcome to the Course! 2m

Inferential Statistical Analysis with Python Guidelines 4m

Introduction to Inference Methods: Oh the Things You Will See! 3m

Bag A or Bag B? 13m

Introduction to Bayesian 4m

This or That? Language and Notation 13m

The Python Statistics Landscape 2m

Intermediate Python Concepts: Lists vs Numpy Arrays 10m

Functions and Lambda Functions, Reading Help Files 11m

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5 readings

Course Syllabus 5m

Meet the Course Team! 10m

About Our Datasets 2m

Help Us Learn More About You! 10m

This or That Reference 10m

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1 practice exercise

Python Basics Assessment 15m

WEEK 2

WEEK 2 - CONFIDENCE INTERVALS

In this second week, we will learn about estimating population parameters via confidence intervals. You will be introduced to five different types of population parameters, assumptions needed to calculate a confidence interval for each of these five parameters, and how to calculate confidence intervals. Quizzes will appear throughout the week to test your understanding. In addition, you'll learn how to create confidence intervals in Python.

7 hours to complete

12 videos (Total 118 min), 5 readings, 3 quizzes **SEE LESS**

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12 videos

Estimating a Population Proportion with Confidence 6m

Understanding Confidence Intervals 10m

Demo: Seeing Theory 5m

Assumptions for a Single Population Proportion Confidence Interval 3m

Conservative Approach & Sample Size Consideration 8m

Estimating a Difference in Population Proportions with Confidence 6m

Interpretations & Assumptions for Two Population Proportion Intervals 4m

Estimating a Population Mean with Confidence 14m

Estimating a Mean Difference for Paired Data 10m

Estimating a Difference in Population Means with Confidence (for Independent Groups) 14m

Introduction to Confidence Intervals in Python 12m

Confidence Intervals for Differences between Population Parameters 21m

5 readings

Confidence Intervals: Other Considerations 15m

What Affects the Standard Error of an Estimate? 10m

Additional Practice: An Introductory Guide to PDFs and CDFs 10m

Additional Practice: Confidence Intervals 1m

Napping and Non-Napping Toddlers Article for Python Assessment 10m

3 practice exercises

Practice Quiz: All About Confidence Intervals 30m

Sample Size & Assumptions 30m

Confidence Intervals Assessment 1h

WEEK 3

WEEK 3 - HYPOTHESIS TESTING

In week three, we'll learn how to test various hypotheses - using the five different analysis methods covered in the previous week. We'll discuss the importance of various factors and assumptions with hypothesis testing and learn to interpret our results. We will also review how to distinguish which procedure is appropriate for the research question at hand. Quizzes and a peer assessment will appear throughout the week to test your understanding.

7 hours to complete

12 videos (Total 138 min), 4 readings, 3 quizzes SEE LESS

12 videos

Setting Up a Test for a Population Proportion 5m

Testing a One Population Proportion 8m

Setting Up a Test of Difference in Population Proportions 7m

Testing a Difference in Population Proportions 8m

Interview: P-Values, P-Hacking and More 24m

One Mean: Testing about a Population Mean with Confidence 17m

Testing a Population Mean Difference 13m

Testing for a Difference in Population Means (for Independent Groups) 12m

Demo: Name That Scenario 2m

Chocolate & Cycling Assignment 2m

Introduction to Hypothesis Testing in Python 20m

Walk-Through: Hypothesis Testing with NHANES 13m

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4 readings

Hypothesis Testing: Other Considerations 10m

The Relationship between Confidence Intervals & Hypothesis Testing 5m

Chocolate & Cycling Assignment Instructions 5m

Additional Practice: Hypothesis Testing 1m

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2 practice exercises

Name That Scenario 15m

Hypothesis Testing in Python Assessment 1h

WEEK 4

WEEK 4 - LEARNER APPLICATION

In the final week of this course, we will walk through several examples and case studies that illustrate applications of the inferential procedures discussed in prior weeks. Learners will see examples of well-formulated research questions related to the study designs and data sets that we have discussed thus far, and via both confidence interval estimation and formal hypothesis testing, we will formulate inferential responses to those questions.

2 hours to complete

6 videos (Total 77 min), 4 readings, 1 quiz **SEE LESS**

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6 videos

The Importance of Good Research Questions for Sound Inference 10m

Descriptive Inference Examples for Single Variables Using Confidence Intervals 12m

Descriptive Inference Examples for Single Variables Using Hypothesis Testing 12m

Comparing Means for Two Independent Samples: An Example 14m

Comparing Means for Two Paired Samples: An Example 12m

Comparing Proportions for Two Independent Samples: An Example 13m

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4 readings

Assumptions Consistency 5m

Revisiting Examples: Accounting for Complex Samples 10m

Course Feedback 10m

Keep Learning with Michigan Online 10m

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1 practice exercise

Assessment 30m