Introduction to Environmental Justice

February, 2023

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# About this Course

# 1 Target Audience

This module is made to provide opportunities for students, especially underserved and minority students, at higher education facilities to explore and critically think about environmental justice data using EJScreen and other tools. It targets the lower division level (undergraduate) students, across a variety of disciplines (e.g., biology, social science). “Marketing” could focus on HBCUs, historically-women’s colleges, community colleges, etc. But, it is open to anyone and should be adaptable for that purpose.

# 2 Guide for Instructors

If you haven’t yet read the getting started Wiki pages; [start there](https://www.ottrproject.org/getting_started.html).

course materials here!

# 3 Learning Outcomes by Subject

When students complete this module, they will be able to:

## 3.1 Science/Data Science (?)

### 3.1.1 Overarching LOs - to be applied at all tiers

* Understand how data science can be used to create environmental solutions for communities
* Place data science questions in context (ecological, environmental, community solution, etc)
* Understand complexities and limitations of data
* Evaluate drawbacks/benefits of tools like EJScreen
* Interpret results in context (ecological, environmental, community solution, etc)

### 3.1.2 Tier 1 (Intro level)

*Prerequisite Knowledge: None!*

* Explain how environmental indices can affect their community
* Evaluate the differences in the tools (EJScreen vs CEJST vs state-based(?) tools)
* And the benefits/drawbacks of the tools and how underlying data influences results (e.g., EJScreen uses census data - that is biased)
* Evaluate the positives and negatives of abstracting a place to one number
* Understand how weighting can impact results
* Question policy-makers and land managers on environmental justice issues
* Collaboratively develop action plans to move forward from their findings (wording of this sentence?)
* Tier 2 (Mid level)

*Prerequisite Knowledge: Basic introduction to data science and statistical analyses, e.g.*

* Access data through R
* Execute pre-written example code and interpret the results
* Construct and modify R code to test hypotheses
* Choose a place and tell a story about why it is identified as an EJ place. What is missing? Is there a place that you thought would show up in EJ screen but does not? What data gap makes that happen?

### 3.1.3 Tier 3 (Upper Division)

*Prerequisite Knowledge:*

* Student-driven project initiatives (SMART principles)
* Formulate a testable question
* Justify why this question is interesting with appropriate background information
* Create a justified hypothesis
* Obtain data from public sources (like EJ screen)
* Process raw data into usable formats
* Analyze data with appropriate statistical methods to answer the question
* Visualize data
* Contextualize results in broader context ((ecological, environmental, community solution, etc)
* Communicate results through - e.g. a paper, poster, flash talk, other format
* quantitative models to address scientific questions?
* Testable question
* Placed in the context
* Obtaining, cleaning, transforming, and processing raw data into usable formats?
* Apply a range of statistical methods for inference and prediction…
* Build data science products that can be used by a broad audience - or can be transferable to other broader contexts

## 3.2 Social Science:

Geared towards students who - Never have made a map before

### 3.2.1 Tier 1:

* Explain how environmental data science tools reflect our understandings of race and can both perpetuate and challenge racism
* Interpret maps
* Navigate the EJScreen tool and/or other similar tools to answer relevant, student-generated research questions about environmental (in)justice
* Understand how these can benefit their own community and neighborhood

### 3.2.2 Tier 2:

* Involve in ethnographic studies
* Be able to infer data with a broad socio-economic context
* Visualization of data using programming languages such as R
* Maybe tie-up with different environmental law firms to get a hands-on learning experience by interning/volunteering!

### 3.2.3 Tier 3:

* Placement opportunities for students interested in continuing this field of science
* Introduce public health implications of the data and research?
* Discuss data ethics?

# 4 Assessment

## 4.1 Student assessment

* Exam questions
* Guided questions for any pre reading
* Guided worksheet for students throughout module
* Individual or collaborative project
* Low-pressure quiz questions

## 4.2 Assessment & evolution of the module itself

* Survey of students pre- and post- course (self efficacy, excitement for data science, data science is relevant to me, etc)
* Survey of faculty/instructors that are actually teaching the course
* Incorporate feedback into further development of the module

# 5 Chapter

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# About the Authors

Info about the authors here!

# Resources

* [ejscreen R package?](http://ejanalysis.github.io/ejscreen/)

# References