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Pedestrian Observation and Data Collection Curriculum Guide

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DATA PROJECT

Pedestrian Observation and Data Collection Curriculum Guide

NITC-ED-999 ■ June 2018

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national university transportation center.*



PEDESTRIAN OBSERVATION AND DATA COLLECTION CURRICULUM GUIDE

READINGS, LECTURE NOTES, ASSIGNMENTS, DATA COLLECTION
FORMS, AND CLASSROOM GUIDANCE

Final Report

NITC-ED-999

by

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16. Abstract This guidebook provides a comprehensive set of class exercises suitable for students in courses related to travel behavior, traffic safety, urban planning and design, community health, or civil engineering. Exercises include activities developed through this project as well as an extensive set of educational materials drawn from online resources. The exercises developed as part of this project focus on pedestrians. They include elements of both traditional traffic counts and behavioral components, the latter of which are often lacking from current data collections efforts. By encouraging students to consider behavioral interactions of roadway users, these exercises can provide field experience with the data that underlies behavioral traffic theory and agent-based traffic models. The materials are organized to provide helpful guidance and insights to instructors that were gained through the pilot testing of classroom materials. Activities drawn from existing resources and an extensive reading list are detailed in the appendices. Materials include lecture slides, data collection forms, and classroom exercises. Activities drawn from existing resources address different facets of pedestrian and bicycle planning. Combined, these resources provide a comprehensive set of educational materials that can be used by instructors with little or no experience in pedestrian-related curriculum as a foundation for incorporating these topics into their teaching. The guide may also prove useful for organizations interested in pedestrian and bicycle planning and provide additional resources for experienced instructors. Specific outcomes include the following: <ul style="list-style-type: none"> • Readings, curriculum, data collections tools, and general research design that instructors can adapt to their needs, while standardizing the data collection method. This can enrich classroom learning and facilitate fieldwork experience. • The data collected from the exercise may provide a benefit to local agencies. Local jurisdictions are often interested in partnering with local university classes on data collection, but time constraints, particularly in the quarter system, can make planning and execution of projects time-prohibitive. 					
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DISCLAIMER

The contents of this guide reflect the views of the authors, who are solely responsible for the facts and the accuracy of the material and information presented herein. This document is disseminated under the sponsorship of the U.S. Department of Transportation University Transportation Centers Program in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof. The contents do not necessarily reflect the official views of the U.S. Government. This guide does not constitute a standard, specification, or regulation.

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EXECUTIVE SUMMARY

This guidebook provides a comprehensive set of class exercises suitable for students in courses related to travel behavior, traffic safety, urban planning and design, community health, or civil engineering. Exercises include activities developed through this project as well as an extensive set of educational materials drawn from online resources.

The exercises developed as part of this project focus on pedestrians. They include elements of both traditional traffic counts and behavioral components, the latter of which are often lacking from current data collections efforts. By encouraging students to consider behavioral interactions of roadway users, these exercises can provide students with field experience that collects data that underlie behavioral traffic theory and agent-based traffic models. The materials are organized to provide helpful guidance to instructors and provide insights gathered through the pilot testing of classroom materials. Activities drawn from existing resources provide a comprehensive set of educational materials that address different facets of pedestrian and bicycle planning.

The educational curricula and resources outlined in this guide allow instructors with little or no experience to integrate pedestrian-related curriculum into their teaching. The guide may also prove useful for organizations interested in pedestrian and bicycle planning and provide additional resources for experienced instructors.

Included curricula are aimed at undergraduate or graduate university students, but can be easily adaptable to high school students or community college classes interested in exploring these issues.

Specific outcomes include the following:

- Readings, curriculum, data collections tools, and general research design that instructors can adapt to their needs, while standardizing the data collection method. This can enrich classroom learning and facilitate fieldwork experience.
- The data collected from the exercise may provide a benefit to local agencies. Local jurisdictions are often interested in partnering with local university classes on data collection, but time constraints, particularly in the quarter system, can make planning and execution of projects time-prohibitive.

1.0 INTRODUCTION

Welcome to the Pedestrian Observation and Data Collection Curriculum project, funded by the National Institute for Transportation and Communities. This guidebook provides a comprehensive set of class exercises suitable for students in courses related to travel behavior, traffic safety, urban planning and design, community health, or civil engineering. Exercises include activities developed through this project as well as a range of existing resources drawn from online resources.

This project developed three pedestrian-focused exercises that include elements of both traditional traffic counts and behavioral components, the latter of which are often lacking from current data collections efforts.

- The first assignment allows students to gain familiarity with manual pedestrian counts along a pathway (*Pathway Counts*).
- In the second assignment, students learn to count pedestrians and bicyclists at intersections (*Intersection Counts*).
- The third exercise focuses on pedestrian crossing behavior (*Crossings/Interactions with Drivers*). By encouraging students to consider behavioral interactions of roadway users (drivers yielding to pedestrians crossing the street), this activity provides students with field experience that generates data that underlie behavioral traffic theory and agent-based traffic models.

Overall, these activities allow students to gain experience in field research design related to traffic safety, while standardizing and collecting much-needed pedestrian data. Materials are organized to provide helpful guidance to instructors and offer insights gathered through pilot testing of classroom materials. Materials include lecture slides, data collection forms, classroom exercises, and readings.

Activities drawn from existing resources include a comprehensive set of educational materials that address different facets of pedestrian and bicycle planning. These resources are listed in Appendix A. Most are linked to or downloaded from the sites listed below, and their terms of use are defined by each site (see each website for details).

- Federal Highway Administration (FHWA;
<https://www.fhwa.dot.gov/publications/research/safety/pedbike/05085/>)
- Portland State University's Initiative for Bicycle and Pedestrian Innovation (IBPI;
<https://www.pdx.edu/ibpi/education-curriculum-modules>).
- Pedestrian and Bicycle Information Center (PBIC;
<http://www.pedbikeinfo.org/training/courses.cfm>)

The educational curricula and resources outlined in this guide allow instructors with little or no experience to integrate pedestrian-related curriculum into their teaching. The guide may also

prove useful for organizations interested in pedestrian and bicycle planning and provide additional resources for experienced instructors.

Included curricula are aimed at undergraduate or graduate university students, but can be easily adaptable to high school students or community college classes interested in exploring these issues.

1.1 HOW TO USE THIS GUIDE

This guide is organized to help an instructor prepare a course module around pedestrian observation and data collection. Using the table of contents, an instructor can navigate directly to whichever piece of information they made need. For some, it may be useful to read the guide chronologically to facilitate the integration of concepts and exercises into the syllabus.

The first section details some of the challenges and considerations that need to be considered when planning to incorporate pedestrian observation and data collection into classroom assignments. Understanding the potential challenges can help an instructor choose the specific resources from the selection provided and help identify which direction they want to take exercises, which they can then select from the variety of resources, including example learning outcomes, syllabus text, and assignments.

Additional readings, organized by subject area, are provided in Appendix B. Course level, subject, and desired focus will guide the readings chosen for a particular class.

1.2 CHALLENGES AND CONSIDERATIONS

1.2.1 Scheduling

As with any group project, the biggest challenge in pedestrian observation or field experiment assignments is scheduling. Assigning groups and requiring out-of-class site visits is more flexible for students and preserves lecture time, but is highly dependent on student attendance. If students are late or do not show up, this seriously affects their group because the observations and experiment require multiple people performing different roles.

Assigning groups the day of a field visit ensures that each group has enough participants to complete the exercises. This method may be best used when the visits take up lecture time, which also necessitates the use of sites closer to the classroom.

1.2.2 Site choice

The selection of appropriate sites can be a challenge, should be carefully considered, and identified well in advance. The choice of sites will depend on the activities' objectives and desired outcomes.

If the class is taking on data collection to assist in a real project (e.g., for a city or an advocacy group), site choice may be constrained. Site choice may be determined based on the focus of the class and/or assignment. An assignment focused on children's health and travel, for example,

would need areas near schools (with any added preparations for collecting data near schools, like approval from the school district). An assignment focused on midblock crossing treatments would necessitate finding midblock crossings for each group (or assigning each group to collect data in one site at different times). If the desire to isolate particular variables of interest (e.g., the race of the pedestrian), then sites should be chosen to control for confounding factors.

In addition, accessibility must be taken into account to make sure all students can access the field sites and are physically able to be at the site for an hour or more.

Selection of sites should also take into account how long the duration of data collection is, and the expected usage of the site by pedestrians. For example, if the desired outcome is an understanding of pedestrian counts at a location, then the actual pedestrian volume is not critical. If the desired outcome is an understanding of driver/pedestrian interactions, however, sites with adequate volume of pedestrians and drivers have to be selected to ensure that students will collect enough data points to analyze interactions.

Pre-selection of sites via a map or Google Earth may not be sufficient, and instructors should consider visiting sites before the assignment.

1.3 EXAMPLE SYLLABUS INFORMATION

The following includes examples for various sections of a syllabus.

1.3.1 Learning outcomes

1.3.1.1 Example #1:

Learning objectives - This assignment aims to improve students' ability to:

- Assess relationships between the physical environment and individual behavior.
- Identify planning and design decisions that promote or hinder walking for transportation.
- Discuss the roles of urban planning and design in shaping the built environment and promoting healthy and safe transportation.
- Gain experience in field data collection, data entry, and analysis.
- Communicate concepts through written and other formats.

1.3.1.2 Example #2

Learning Objectives:

- Students will learn why it is important to plan for walking as a form of transportation, and some of the challenges in collecting data about walking.
- Students will learn about how these field tools are accessible to them, and how they may be able to improve on existing tools.
- Students will do a round of data collection, including multimedia audits, and reflect on that process.

1.3.2 Syllabus section

1.3.2.1 *Example section #1:*

Street observation assignment - X%

This is a group project (groups will be pre-assigned). This project will require one out-of-class field visit as a group, and data entry and a group report done either in person or via shared online documents. You will need to choose a date and time when all members of the group can make the field visit. Please ensure that all group members play a role in creating the final report, which is due by the end of class on X date. Details on this project will be provided in class on Y date.

1.3.2.2 *Example section #2:*

Street observation assignment – X%

This assignment will be conducted in groups. Groups will be assigned on the day of the field observation (check the class schedule). Each group will be assigned a site near the classroom. After reviewing the data collection forms, we will head out to do the data collection. Please wear comfortable clothes and bring a bottle of water and anything else you will need to be in the field for the duration of lecture time. Data entry and the report writing will be done as a group, either in person or via shared online documents like Google Docs, Evernote, etc. Please ensure that all group members play a role in creating the final report, which is due by the end of class on X date. Details on this project will be provided in class on Y date. If you must miss the day of the field visit, let me know as early as possible so we can discuss how you will complete the assignment.

1.3.3 Readings to assign (Examples)

Overall problem:

Patek, G. C., & Thoma, T. G. (2013). Commentary: Pedestrian Fatalities—A Problem on the Rise. *Annals of Emergency Medicine*, 62(6), 613–615.
<http://doi.org/10.1016/j.annemergmed.2013.09.019>

Equity issues:

Pedestrians Dying at Disproportionate Rates in America's Poorer Neighborhoods. (n.d.). Retrieved October 16, 2015, from <http://www.governing.com/topics/public-justice-safety/gov-pedestrian-deaths-analysis.html>

Pedestrian attitudes:

Kothuri, S., Clifton, K., & Monsere, C. (2014). Insights into Pedestrian Attitudes and Perceptions of Delay, Safety, and Crossing Decisions at Signalized Intersections. Presented at the Transportation Research Board 93rd Annual Meeting. Retrieved from <https://trid.trb.org/view/1289260>

Street design:

Ewing, R., Hajrasouliha, A., Neckerman, K. M., Purciel-Hill, M., & Greene, W. (2016). Streetscape Features Related to Pedestrian Activity. *Journal of Planning Education and Research*, 36(1), 5–15. <http://doi.org/10.1177/0739456X15591585>

Pedestrian behavior:

Sisiopiku, V. P., & Akin, D. (2003). Pedestrian behaviors at and perceptions towards various pedestrian facilities: an examination based on observation and survey data. *Transportation Research Part F: Traffic Psychology and Behaviour*, 6(4), 249–274. <http://doi.org/10.1016/j.trf.2003.06.001>

Pedestrian distraction:

Hyman, I. E., Boss, S. M., Wise, B. M., McKenzie, K. E., & Caggiano, J. M. (2010). Did you see the unicycling clown? Inattention blindness while walking and talking on a cell phone. *Applied Cognitive Psychology*, 24(5), 597–607. <http://doi.org/10.1002/acp.1638>

Driver bias and behavior:

Piff, P. K., Stancato, D. M., Côté, S., Mendoza-Denton, R., & Keltner, D. (2012). Higher social class predicts increased unethical behavior. *Proceedings of the National Academy of Sciences*, 109(11), 4086–4091. <https://doi.org/10.1073/pnas.1118373109>

1.4 LECTURE SLIDES

1.4.1 Example #1:

Weigand slides on pedestrian data collection and research issues. ([PDF](#))

1.4.2 Example #2:

Goddard slides for undergraduate healthy communities' course. ([PDF](#))

1.5 ASSIGNMENTS

1.5.1 Pathway Counts

1.5.1.1 Instructor instructions, assignment text, forms (PDF)

1.5.2 Intersection Counts

1.5.2.1 Instructor materials, assignment text, forms (PDF)

1.5.3 Crossings/Interactions with Drivers

1.5.3.1 Instructor materials

Instructions (PDF), PowerPoint slides (PDF)

1.5.3.2 Student material

Assignment (PDF)

1.5.3.3 Forms & instructions

Data collection instructions (PDF)

Data collection forms:

- Intersection Characteristics (Sheet 1) (PDF)
- Pedestrian Characteristics (Sheet 2) (PDF)
- Driver Yielding Behavior (Sheet 3) (PDF)
- Driver Demographics (Sheet 4) (PDF)

Simplified data collection forms:

- Driver Characteristics (PDF)
- Pedestrian Counts (PDF)

1.5.3.4 Data entry & analysis

Excel Workbook (for data entry) (XLS)

Suggested observational assignment tests (PDF)

APPENDICES

APPENDIX A: EXISTING RESOURCES

Table 1: Resources and publications available through FHWA
[\(https://www.fhwa.dot.gov/publications/research/safety/pedbike/05085/\)](https://www.fhwa.dot.gov/publications/research/safety/pedbike/05085/)

Lesson Name	Adobe Lo-Res (Web)	PowerPoint Lesson ¹	Web Page for Course Overview
All 24 Lessons Combined	PDF		
Lesson 1: The Need for Bicycle and Pedestrian Mobility	PDF	PDF	Lesson 1
Lesson 2: Bicycling and Walking in the United States Today	PDF	PDF	Lesson 2
Lesson 3: Pedestrian and Bicyclist Safety	PDF	PDF	Lesson 3
Lesson 4: Bicycle and Pedestrian Planning	PDF	PDF	Lesson 4
Lesson 5: Land Use Regulations to Encourage Nonmotorized Travel	PDF	PDF	Lesson 5
Lesson 6: Traditional Neighborhood Design	PDF	PDF	Lesson 6
Lesson 7: Adapting Suburban Communities for Bicycle and Pedestrian Travel	PDF	PDF	Lesson 7
Lesson 8: Pedestrian Characteristics	PDF	PDF	Lesson 8
Lesson 9: Walkways, Sidewalks, and Public Spaces	PDF	PDF	Lesson 9
Lesson 10: Pedestrian Facility Signing and Pavement Markings	PDF	PDF	Lesson 10
Lesson 11: Pedestrian Design at Intersections	PDF	PDF	Lesson 11
Lesson 12: Midblock Crossings	PDF	PDF	Lesson 12
Lesson 13: Selecting Bicycle Facility Types and Evaluating Roadways	PDF	PDF	Lesson 13
Lesson 14: Shared Roadways	PDF	PDF	Lesson 14
Lesson 15: Bicycle Lanes	PDF	PDF	Lesson 15
Lesson 16: Bicycle Facility Maintenance	PDF	PDF	Lesson 16
Lesson 17: Bicycle Parking and Storage	PDF	PDF	Lesson 17
Lesson 18: Bicycle and Pedestrian Connections to Transit	PDF	PDF	Lesson 18
Lesson 19: Greenways and Shared-Use Paths	PDF	PDF	Lesson 19
Lesson 20: Traffic Calming	PDF	PDF	Lesson 20
Lesson 21: Bicycle and Pedestrian Accommodation in Work Zones	PDF	PDF	Lesson 21
Lesson 22: Tort Liability and Risk Management	PDF	PDF	Lesson 22
Lesson 23: International Approaches to Bicycle and Pedestrian Facility Design	PDF	PDF	Lesson 23
Lesson 24: A Comprehensive Approach: Engineering, Education, Encouragement, Enforcement, and Evaluation	PDF	PDF	Lesson 24

¹Slides are annotated. PowerPoint files that include instructor notes can be downloaded from the source website.

Table 2: Curriculum modules and educational materials available through Portland State University's Initiative for Bicycle and Pedestrian Innovation (IBPI, <https://www.pdx.edu/ibpi/education-curriculum-modules>).

Module	Developed by	Materials for Download
<p>Bicycle and Pedestrian Master Plans Creating a Master Plan for bicycling and pedestrians is one of the first steps in achieving active transportation goals. This module explores the unique needs of pedestrians and bicyclists and the elements present in a complete Master Plan. Steps to creating a Master Plan and the components that make up a plan are explained.</p>	<p>Lynn Weigand, Ph.D. Portland State University</p>	<p>Overview (PDF) Slides (PDF) Lecture Notes (PDF) Assignment 1 (PDF) Assignment 2 (PDF) Assignment 3 (PDF)</p>
<p>Bicycle and Pedestrian Programs and Design Movements: There is an array of programs and initiatives within the fields of transportation, planning and public health that relate to or support pedestrian and bicycling policies and infrastructure, and education and encouragement programs. This module introduces different movements in transportation and design that lend themselves to more bicycle and pedestrian oriented planning.</p>	<p>Lynn Weigand, Ph.D. Portland State University</p>	<p>Overview (PDF) Slides (PDF) Lecture Notes (PDF) Assignment 1 (PDF) Assignment 2 (PDF)</p>
<p>Bicycle Facility Design: Bicycle facilities range from conventional bike lanes to coordinated way finding systems, all acting to improve the safety and comfort of bicyclists. This module reviews different types of facilities available to jurisdictions to improve their bikeway network. They are drawn from international best practices and this module give an overview of when and how they can be used.</p>	<p>Lynn Weigand, Ph.D. Portland State University</p>	<p>Overview (PDF) Slides (PDF) Lecture Notes (PDF) Assignment 1 (PDF) Assignment 2 (PDF) Assignment 3 (PDF)</p>
<p>Data Collection: This module reviews some of the methods and reasons behind conducting research on bicycle and pedestrian planning. Research on bicycle and pedestrian planning helps answer questions about behavior, needs, and will help set benchmarks to determine the progress and success of a program. From answering questions about users to facilities, this research can improve the outcomes of a bicycle or pedestrian facility and network.</p>	<p>Lynn Weigand, Ph.D. Portland State University</p>	<p>Overview (PDF) Slides (PDF) Lecture Notes (PDF) Assignment 1 (PDF) Assignment 2 (PDF)</p>
<p>Education and Encouragement Programs: This module looks at ways a variety of organizations are educating and encouraging youth to be safe bicyclists and pedestrians. Since children see, hear, and process information differently than adults, education programs must be crafted specifically with the child’s developmental ability in mind. Education and encouragement activities for youth take on a variety of forms and intend to impart healthy habits for life.</p>	<p>Lynn Weigand, Ph.D. Portland State University</p>	<p>Overview (PDF) Slides (PDF) Lecture Notes (PDF) Assignment 1 (PDF) Assignment 2 (PDF) Assignment 3 (PDF)</p>

<p>History of Bicycle and Pedestrian Planning: This module begins by looking at the history of bicycle and pedestrian travel, or active transportation, and ways in which it has been designed and funded in the United States. Active transportation choices have economic, health, and environmental benefits, which makes it increasingly relevant to communities across the United States today. The module ends with a discussion on current collaborations among different organizations and institutions that focus on improving bicycle and pedestrian transportation.</p>	<p>Lynn Weigand, Ph.D. Portland State University</p>	<p>Overview (PDF) Slides (PDF) Lecture Notes (PDF) Assignments (PDF)</p>
<p>Pedestrian Facility Design: Pedestrians are a diverse group with different facility needs. The four primary design elements for pedestrians are outlined. Strengths of the different facility types, how to plan for the American with Disabilities Act (ADA), and theories such as Universal Design are discussed to give planners and advocates a better idea of how to create a welcoming pedestrian environment.</p>	<p>Lynn Weigand, Ph.D. Portland State University</p>	<p>Overview (PDF) Slides (PDF) Lecture Notes (PDF) Assignment 1 (PDF) Assignment 2 (PDF)</p>
<p>Trail Design: Trails are increasingly being used as a vital component to the bicycle and pedestrian network and are seen as an asset to the community. Traditionally, trails in communities were primarily for recreational purposes. Now they are providing needed connections between communities and a safe place to ride. This module looks at the variety of trail types and the components that are necessary for a successful trail project.</p>	<p>Lynn Weigand, Ph.D. Portland State University</p>	<p>Overview (PDF) Slides (PDF) Lecture Notes (PDF) Assignment 1 (PDF) Assignment 2 (PDF) Counting Form (PDF)</p>
<p>Transportation Facilities Design is a curriculum module developed for a graduate education course required for graduate students in transportation engineering. It introduces common facility design concepts for transportation infrastructure. The report summarizes the information included in the course, supplemental materials developed from the course, and resulting course assessment.</p>	<p>Karen Dixon, Ph.D. Oregon State University</p>	<p>Curriculum Report (PDF)</p>
<p>Integrating Bicycle & Pedestrian Topics into Transportation Engineering Curriculum: Presentations outline lessons learned from including projects into engineering curriculum and connecting them to the profession (undergraduate education).</p>	<p>Miguel Figliozi Ph.D. & Chris Monsere, Ph.D., P.E. Portland State University</p>	<p>PowerPoint Presentation (PDF)</p>
<p>History of Bike & Pedestrian Planning and Engineering: Provided presentations provide introductory material for bicycle planning curriculum.</p>	<p>Susan Mason, Ph.D. Boise State University</p>	<p>Bicyclist Planning for Engineering 108 - Intro (PPT) Brief History of Portland</p>

	Peter Koonce, P.E. Portland State University	Pedestrian and Bicycling Evolution - Part #1 (PPT) Bicycle & Pedestrian Design and Planning Topics - Part #2 (PPT) Bicycle Design and Planning Topics - Part #3 (PPT)
Bike & Pedestrian Counting: Provided forms and sample data that can be used to collect bicycle and pedestrian data.	Krista Nordback, Ph.D., P.E. Portland State University	Bicycle Turning Movement Count Form (PDF) Example data from Eco Counter (XLSX) Bicyclist and Pedestrian Counting Example Form (PDF) Motorist Turning Movement Count Form (PDF) Pedestrian and Bicycle Data Collection (PDF)
USP 465-565 Pedestrian & Bike Planning: This class examines the importance of walking and bicycling as means of transportation in sustainable urban environments. Topics covered include the planning, design and implementation of bikeways and walkways, as well as ancillary facilities such as bike parking. Materials provided include: Detailed syllabus (undergraduate and graduate students), course assignments.	Jennifer Dill, Ph.D. Portland State University	Syllabus (PDF) Assignment 1 - Interview (PDF) Assignment 2 - Master Plan Evaluation (PDF) Assignment 3 - Pedestrian Audit (PDF) Assignment 4 - Ped/Bike Counts (PDF)
CE 493-593 Bike & Pedestrian Infrastructure Design and operational concepts in the engineering design of bicycle and pedestrian facilities in on-road and shared path locations. Specific topics include basic geometric design, intersection and signalization considerations, and amenities supporting non-motorized modes. Materials provided include: Detailed syllabus (undergraduate and graduate students), course assignments, some lecture slides and notes.	Chris Monsere, Ph.D., P.E. Portland State University	Syllabus (PDF) Reading List (PDF) Assignment 1 - Planning Review (PDF) Assignment 2 - LOS Problems (PDF) Assignment 3 - Bicycle Ped Ops (PDF) Lecture 1 notes- Introduction (PDF) Lecture 7 - Bicycle Facility Design (PDF) Lecture 7 - Bicycle Facility Design – with notes (PDF) Lecture 9 - Ped Design & Operation (PDF)
USP 411-511 Bike & Pedestrian Lab This course requires student groups 4 to identify and work with TriMet, the local transit agency, on selected transit stops/centers to develop an access improvement plan. The course is structured to	Mike Rose, PLA, & Mike Tresidder Portland State University	Syllabus (PDF) Reading List (PDF) Overview (PDF) Sample Project #1 - Problem Statement (PDF)

<p>require students to develop working papers, plans, and presentations that demonstrate their learning and learning outcomes. Sample problems used in the course as well as examples of products produced by students given the specific sample problem.</p>		<p>Sample Project #1 - Existing Conditions Report (Student work) (PDF) Sample Project #2 - Problem Statement (PDF) Sample Project #2 - Project Understanding (Student work) (PDF) Sample Project #2 - Final Presentation (Student work) (PDF) Sample Project #3 - Existing Conditions Report (PDF) Sample Project #3 - Existing Conditions Presentation (PDF) Sample Project #3 - Final Presentation (PDF) Sample Project #4 - Final Paper (PDF)</p>
<p>CE 351 Transportation Systems: The materials provided are project examples that were used as part of a undergraduate transportation course in Civil and Environmental.</p>	<p>Miguel Figliozi, Ph.D. Portland State University</p>	<p>Sample Project - Existing Transportation Conditions Summary (PDF) Calculating Green Times for Bicyclists (PDF) Example Group Project & Presentation (PDF) Example Transportation Project (PDF)</p>

Table 3: Resources provided by the Pedestrian and Bicycle Information Center (PBIC) for an undergraduate university course and UCLA’s adaptation of the materials. (PBIC also provides materials for a graduate level course upon request; see <http://www.pedbikeinfo.org/training/courses.cfm>)

Resource	Resource type	Material for download
<i>PBIC Bicycle and Pedestrian Transportation Short Series:</i> This Short Series is designed to supplement an existing <u>undergraduate</u> engineering course, but some of the materials may be relevant for courses in planning, public health, public policy, etc. We encourage instructors to tailor these materials for different courses.	Instructor Information Sheet	PDF
	Reading List	PDF
	Presentation: Planning (Class 1)	PDF
	Planning (Class 1) – Speaker notes	PDF
	Facility Design (Class 2)	PDF
	Facility Design (Class 2) – Speaker notes	PDF
	Data Performance (Class 3)	PDF
	Data Performance (Class 3) – Speaker notes	PDF
	Assignment: Walkability Assessment/Audit	PDF
	Assignment: Existing Conditions and Facility Design	PDF
	Assignment: Bicycle Level of Service and Level of Traffic Stress Analyses	PDF
Example analysis: Bicycle Level of Service (BLOS)	JPG	
Example analysis: Traffic Stress Analysis (TSA)	JPG	
Assignment: Assessing Level of Service	PDF	
Example analysis: Assessing Level of Service	XLS	
<i>UCLA Bicycle and Pedestrian Transportation Course (8 weeks; adopted from PBIC course)</i>	Course Syllabus	PDF
	Course Assignments (4)	PDF

APPENDIX B: LITERATURE BY SUBJECT AREA

Pedestrians and Infrastructure

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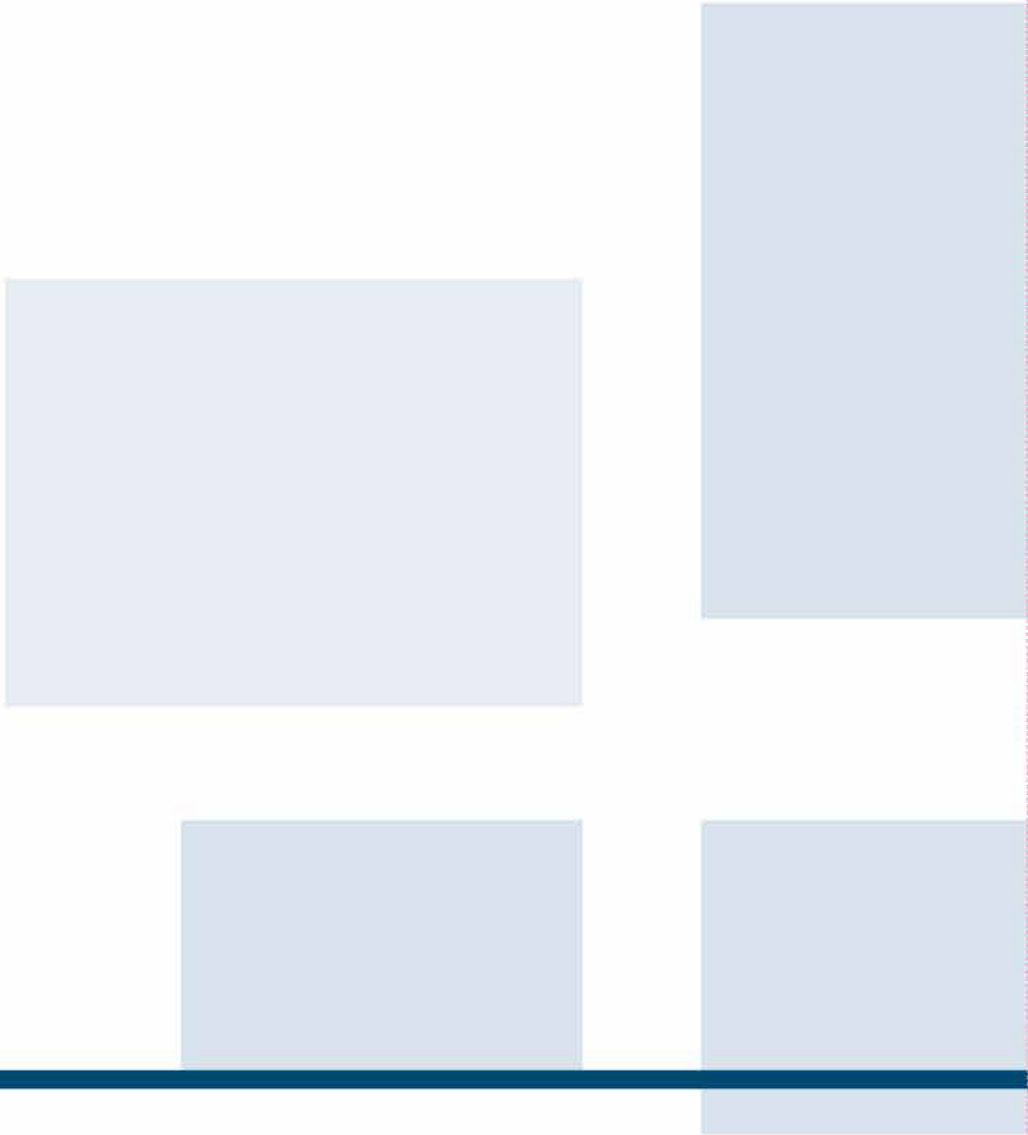
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