

CE 580 Road Ecology – Spring 2007
Montana State University – Civil Engineering Department
Credits: 3

Course Syllabus

Course Description and Objective

This course provides multidisciplinary coverage of ecological effects of transportation systems, primarily focusing on rural highways. Ecological impacts on air quality, water quality, vegetation, and wildlife will be covered. Upon completing this course students will understand the following items in relation to this topic:

- How to identify, assess and manage the ecological impacts of roads and other linear development features (e.g., railroads, pipelines, powerlines)
- Approaches/techniques to integrate conservation and transportation/land use planning
- Governmental processes, mandates and mechanisms that regulate construction, planning and design of roads and other linear development features
- How to apply landscape ecology principles to transportation system design including highway design elements for environmental mitigation

Who should take this Course?

Any student with interest in the impacts that people have on the ecology of the natural environment and want to learn more sustainable methods to reduce the severity of these effects on multiple scales (e.g., local, regional and global) of biodiversity. Students from engineering, ecology, environmental science, resource management, geography, landscape architecture, planning and design or similar disciplines are welcome.

Prerequisites

Graduate standing or junior standing and CE 350 for engineering students, or junior standing and instructor/advisor permission for other majors

Course Details

- Location: Roberts 208
- Times: MWF 1:10-2:00 PM
- (location and time may be changed)
- Website: www.coe.montana.edu/wti/patm/courses/ce580/ce580-2.html

Grading

Literature Review Paper: 15%

1st Exam: 25%

2nd Exam: 25%

Project: 25%

Class Participation 10%

Co-Instructors

Patrick McGowen, Assistant Professor
Civil Engineering
212 Cobleigh Hall
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Daniel Smith, Research Scientist
Western Transportation Institute
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Assigned Text

Forman, R.T.T., Sperling, D., Bissonette, J., Clevenger, A., Cutshall, C., Dale, V., Fahrig, L., France, R., Goldman, C., Heanue, K., Jones, J., Swanson, F., Turrentine, T. & Winter, T. 2003. *Road ecology: Science and solutions*. Island Press, Washington, DC.

Supplemental readings and materials will be handed out in class as needed.

Course Assignments

Literature Review

Students will be asked to select a topic in road ecology (read approximately 5 papers on the subject) and write a detailed, yet concise 5-7 page synthesis (in journal format) summarizing and discussing that issue.

Class Project

Students will act as consultants/scientific advisors and participate in the assessment, planning and design process involved with a specific highway project. Throughout the project, the students will utilize ecological principles in the planning and design of the roadway. They will be required to develop many of the deliverables involved in a real project such as an environmental impact statements, design documents, and public outreach presentations.

Field Trip

The class will visit a recently completed highway project designed to alleviate previous impacts on wildlife mortality and movement. We will meet with the site design team and current research professionals monitoring the area; discuss the opportunities and constraints associated with the project, and view effects on existing water resources, vegetation and wildlife movement patterns.

Course Schedule

- Jan. 19: Course Introduction; McGowen
- Jan. 22: Issues in Road Ecology; Smith
- Jan 24: Landscape Ecology and Scientific Background; Smith
- Jan. 29: History and Development of Road System; McGowen
- Jan. 31: Air Quality; McGowen
- Feb. 5: Water Quality and Wetlands; **Jeanette Romig**, Oasis Environmental Inc.
- Feb. 7: Aquatic Habitat; **Matt Blank**, Research Assistant, WTI-MSU
- Feb. 14: Wildlife Habitat Issues; Smith
- Feb. 19: Vegetation & ROW Management, **Tracy Dougher**, Assist. Prof. of Plant Sciences, MSU

- Feb. 26: Habitat Fragmentation, Edge Effects; Smith
- Feb. 28: Data Analysis and Statistics; Smith
- Mar. 5: Field Methods and Measurements; **Marcel Huijser**, Research Ecologist, WTI-MSU
- Mar. 7: Midterm
- Mar. 12, 14: Spring Break
- Mar. 19: Wildlife Impact Assessments and Remedies; Smith
- Mar. 21: Legislative Context; McGowen
- Mar. 26, 28: Students are required to attend at least one session of the New Intersections Road Ecology for Conservationists Workshop & Training Course, and guest discussion with **Richard Forman**, Professor of Landscape Ecology, Harvard
- April 2: Planning and Design Process; McGowen
- April 4: Environmental Impact Statements; McGowen
- April 9: Project Coordination / Streamlining; **Amanda Hardy**, Research Ecologist, WTI-MSU
- April 11: Context Sensitive Solutions and Performance Measures; McGowen
- April 16: National WVC Study; McGowen
- April 18: Use of GIS and Habitat Connectivity Models; Smith
- April 23: Non-Native Vegetation Along Roadways, **Frank Dougher**, Research Associate, Weed Ecology Lab, MSU
- April 25: Student Presentations on other linear features (Right of Way and Utilities, Dams and Waterways, Railways)
- April 30: Road Removal; Wildlands CPR
- May 2: Student Project Presentations
- May 7: Final Exam