Overview: The first part of this course presents traditional ecology with an emphasis on community interactions and co-evolution. Although terrestrial ecosystems are arguably more important in the context of landscape ecology than marine ecosystems, all systems interact with each other. For example the desert sands of the Sahara fertilize the Caribbean and rising sea levels threaten coastal wetlands and their associated human communities.

Our understanding of how ecosystems function is rudimentary at best but each year brings deeper knowledge. Unlike traditional ecology, landscape ecology encompasses (some would say revolves around) human modified environments and the social and ecological implications of this modification. Landscape ecology quite properly considers social and political factors alongside the ecological.

Outcomes: By the end of this course students should be able to:

1. Explain the differences between biomes and understand the factors which lead to these differences;
2. Use an understanding of community interactions to explain potential impacts of urban and suburban development;
3. Demonstrate (through a major written project) the ability to combine the topics studied during the course into the discussion of a hypothetical landscape development.

Format: The first weeks of the course will be relatively lecture intensive as we examine basic ecological concepts. As this knowledge is gained we will spend more time looking at applied examples. The classes are long and are expected to be interactive. Topics listed are for guidance only – if the class is interested in exploring a topic we will do so. Students will be expected to be familiar with current environmental/ecological affairs and will be encouraged to present these in class. Powerpoint lectures will be supplemented with appropriate videos and there will be several field trips.

Assessment:

1. Class participation and attendance – 15%
2. Essay on the ecology of a Colorado organism 15%
3. Major project 40%
4. Presentation – 10%
5. Quizzes (5 – lowest score dropped) 20%
Classes will be built around several of these topics – we will not have time to cover them all.

1.0 Ecology – natural community and environment (ecosystems)
   1.1 Natural Communities
   - Vegetation as surrogate for biodiversity
   - Habitat and niche
   - Nutrient cycling
   - Production, consumption, decomposition
   - Trophic levels and food chains
   - Interdependence of life
   1.2 Environment
   - Geology
   - Landform – geomorphology
   - Weathered surface – soils
   - Hydrology
   - Wetlands and waterways

2.0 Landscapes – natural environment, built environments and interface between (where landscape architects play), impacts of built on natural environments
   2.1 Physical impacts
   - Land clearing
   - Fragmenting habitat
   - Ameliorate through wildlife corridors
   2.2 Changes to water cycle
   - Hydraulic (flooding)
   - Water quality (nutrient enrichment especially nitrogen and phosphorus)
   - Water sensitive urban design and bio-infiltration
   2.3 Spreading weeds and pests
   - Ameliorate through management
   - Filling open niches by restoration
   - Sealing vegetation against weed propagules
   2.4 Human and companion access
   - Control with managed restricted access
   - Paths and lookouts
   2.5 Integrated buffer solutions for waterways, wetlands and forests
   - Waterway as natural wildlife corridors
   - Corridor core and buffers
   2.6 Waterway hierarchy
   - First and subsequent order stream from mainly dry drainage gullies to major rivers
   - Appropriate corridor and buffer width (see above)
2.7 Protecting wetlands from nutrient enrichment
2.8 Restoration and rehabilitation of degraded vegetation and habitat through natural planting design
  - Direct seeding versus planting seedlings
  - Local provenance of plant material
2.9 Site-based Maintenance and Management Plans

Required text:


Recommended texts:


The required text for this course was chosen for applicability and enduring usefulness (i.e. they are considered useful additions to any landscape architect or planner’s library). They are available in the bookstore, online and at local bookstores. Suggested texts can be purchased or ordered locally at the Tattered Cover Bookstore or remotely from Amazon (occasionally used copies are available).
RESOURCES

Writing Center:

Writing is important in this class. If you need any help with writing please check out the Writing Center: http://www.ucdenver.edu/academics/colleges/CLAS/Centers/writing/Pages/TheWritingCenter.aspx

POLICIES

University of Colorado Denver policies for student conduct can be referenced at:

http://catalog.ucdenver.edu/content.php?catoid=18&navoid=4277&hl=university+policies&returnto=search

Academic Honesty & Plagiarism

All students are responsible for knowing and adhering to the academic integrity policy at this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying bribery, and threatening behavior. Violations of these policies will result a failing grade for the assignment, and may lead to disciplinary action. For more information, please see the College of Architecture and Planning's Honor Code:


and CU Denver's academic policies

http://catalog.ucdenver.edu/content.php?catoid=16&navoid=3369#Honor

All University and College policies, as well as common sense, regarding academic honesty applies in this course. When working in a group, it is the responsibility of everyone in the group to maintain the norms of academic integrity.

Students may do joint work with other courses only with the permission of all instructors and when the work is suitable for the topic and the course.

Learning Environment

Students and faculty members each have a responsibility for maintaining an appropriate learning environment. Respect for others is paramount. Students who fail to adhere to behavioral standards may be subject to discipline. Faculty members have a professional responsibility to treat students with understanding, dignity, and respect, to guide classroom discussion and to set reasonable limits on the manner in which students express opinions. Bullying and harassment will not be tolerated.

**Discrimination**

The University of Colorado Denver adheres to Title IX, which states that, "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance."

[http://www.ucdenver.edu/policy/TitleIX/Pages/default.aspx](http://www.ucdenver.edu/policy/TitleIX/Pages/default.aspx)

**Disabilities**

If you qualify for accommodations because of a disability, please submit a letter to the instructor from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact the appropriate campus agency.


**Safety And Risk Management**

Policies exist for the safety of our academic community. These include firearms, alcohol and hazardous materials, as well as behaviors and situations. A list of hazardous materials is posted in all studios.

**Accommodation for Religious Observances**

Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. In this class, we will work with individuals on a case-by-case basis. Please notify the instructor in a timely manner so that accommodations can be arranged.
Schedule: Please note that this is an outline only and is subject to change both with and without notice.

| Week 1     | Introduction, discussion of course and overview lecture |
| Week 2     | Life on land, life in water                            |
| Week 3     | Field trip to the Rocky Mountain Arsenal               |
| Week 4     | Temperature and water relations **Quiz 1**            |
| Week 5     | Energy and nutrient relations; Population distribution and abundance |
| Week 6     | Mutualism; Species abundance and diversity; Food webs **Essay due** |
| Week 7     | Primary productivity; Nutrient recycling **Quiz 2**   |
| Week 8     | Succession and Stability                              |
| Week 9     | Land clearing, fragmentation, wildlife corridors       |
| Week 10    | Water quality, nutrient enrichment, pesticides **Quiz 3** |
| Week 11    | Urban Ecology Socio-Ecological Assemblages and Hybrid Ecologies |
| Week 12    | Remote sensing, audio ecology                         |
| Week 13    | Environmental ethics                                  |
| Week 14    | Case studies **Major project due Quiz 4**             |
| Week 15    | Fall break                                            |
| Week 16    | Major project presentations                           |
| Week 17    | Wrap up and **Quiz 5**                               |

**Minor Project**

Choose any Colorado species and discuss its ecology. In view of the credit this earns (20%) 1500-2000 words will be sufficient. I expect at least **fifteen references** and half of these must be scientific papers. Diagrams and/or figures or photographs are encouraged.

You will need to introduce your species and then describe where it lives, the sort of food that it eats (if it is an animal) and what particular environmental challenges it faces and how it copes with them. There is a sufficient range of biomes in Colorado that you have a great deal of latitude (pun unintended) in what you write about.

If you need further guidance feel free to discuss this with me.

**Major Project**

Discuss the ecosystem of your choice. It can be as broad or as narrow as you want. It is just as appropriate to refer to the human digestive tract as an ecosystem as it is to use the same term for a coral reef. To ensure this isn’t just straight quotation of facts I also require a discussion of potential and current human impacts on this ecosystem.

You will need to have **20-30 references** (I will allow websites) and illustrate the project with appropriate diagrams and photographs. I expect somewhere in the region of 2500-4000 words.

How you organize it is pretty much up to you but obviously an introduction, discussion, conclusion, summary and works cited would be a minimum. You will be required to present your project to the class (10%)
About your Professor

Born in England, Dr. Ryan has lived in Jersey in the (English) Channel Islands, New Zealand, and Fiji. Upon graduation from high school, he was selected for one year of Volunteer Service Abroad in Sarawak, Borneo where he taught at an upriver high school. He attended the University of Canterbury in New Zealand earning a First Class Honors degree and a Doctorate in Zoology. Dr. Ryan spent over ten years teaching Biology at the University of the South Pacific in Suva, Fiji. He then went on to join the West Coast Regional Council, serving first as a freshwater biologist and then as an Environmental Planner. He started a freelance Environmental Consultancy business and carried out many environmental surveys for local industry.

Dr. Ryan has published 11 books, 32 scientific papers and articles, 37 reports and several hundred newspaper articles. He has also held photographic and/or advisory jobs for Television New Zealand, the BBC and Grenada Television, and the New Zealand Department of Foreign Affairs and Trade among others. In 1997, Dr. Ryan moved to Denver and taught Biology for two years at Metropolitan State College and the Colorado School of Mines before joining Johnson & Wales University where he was a full professor in the School of Arts and Sciences. Dr. Ryan is a PADI Divemaster with close to 1300 dives logged, and he also works as a semi-professional nature photographer, in 2010 his iguana photo was on the front cover of National Geographic Explorer magazine (May issue) and in 2013 his photograph of a Fijian freshwater goby was featured on their new $10 bill. He also has a personal trainer certification from the Aerobics and Fitness Association of America and works part time at Anytime Fitness.

In the summer of 2011 he drove to Costa Rica and back, clocking up 10,059 miles while visiting Mexico, Belize, Guatemala, El Salvador, Honduras and Nicaragua on the way. In the summer of 2013 he dived in Lake Malawi and climbed Mt Kilimanjaro.

Paddy will be leading a dive trip to Honduras in July 2016, all are welcome!

You can check out his photos and publications at www.ryanphotographic.com. Dr Ryan uploads daily nature photos to his Ryan Photographic Facebook page https://www.facebook.com/RyanPhotographic?ref=settings

You are welcome to “friend” Ryan Photographic but Dr. Ryan won’t allow current students to be Facebook friends. That will have to wait until the course is over!