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### EVST 360.01: Applied Ecology

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**Purpose:** Understanding the principles & concepts of ecology & how they inform real life decisions about human interaction with the environment. Will emphasize conservation of biodiversity and watersheds and design of field studies. **Prerequisites:** Chem 151, Bio 100, Math 241, EVST 201 (or similar courses)

### Week Topic & references

9/3 Course goals/mechanics. What is Applied Ecology? *Smith Ch 1; Newman Ch 1; Cox chs 1-3*

**Ecological Literacy**--Ecological concepts (& methods) that inform human decisions

9/10 Ecosystem concepts *Smith Ch (2,3,4),27 Sept 19 Clark Fork cleanup plan hearing*

to All life and economic activity depends on earth support systems (ecosystem services);

9-24 resources/services come from ecosystems & depend on their health/integrity/**condition**.

Support systems have limited **capacity** to supply goods/services & to assimilate change.

Natural **change** contributes to diversity but makes it hard to identify human-caused change.

Support systems are **connected**—our actions have unexpected, indirect effects.

Local populations/communities/ecosystems are linked in global systems

(parts  $\leftrightarrow$  whole); importance of incremental, cumulative effects

Energy flow & productivity *Smith 24*

Material cycles (especially water) *Smith 25 & 26 & environmental fate of chemicals Newman 9*

9/26 Community concepts *Smith Ch 20,21,23* (read about your studied community ch 28-30)

to Niche & Habitat (see in Smith)—every species has a role (keystone, indicator, umbrella species)

10/10 Interactions/connections—competition, predation, cooperation/symbiosis, coevolution

Role of **change** – succession, disturbance, stability, resilience, flexibility, predictability

Diversity—types & significance of diversity; Why and how to maintain biodiversity

**10/1 & 10/10 \*\*\*1<sup>st</sup> & 2nd takehome questions due\*\*\* 10/14 'last day' to drop or change grading system**

10/15 Organisms and their environment; adaptation *Smith Ch 5 (6-8 if relevant to your study)*

10/17 Population concepts *Smith Ch see below; Newman Ch 10*

to What are populations and species? *Smith ch 10*

10-29 change in quantity—rate/regulation of growth, carrying capacity, ecofootprint *Smith 11,12*

change in quality—evolution, genetic diversity, flexibility, population viability analysis *S19,18*

10-31 Cox on Statistics in Ecological studies

11/7-12/12 **Applying Ecological Literacy in decision making for a sustainable society**

The science behind environmental policy – see Newman chapters(N) indicated below

Possible topics (reading will be assigned after class selects topics): Ecosystem Management vs CPR-- N 11

Watersheds --Clark Fork case study <http://epa.gov/region8/superfund/sites/milltowncfrou.html>

Toxicology and setting environmental & human health standards N9; Forests (Fire) N 7

Value of Nature – Ecological economics; Dailey/Costanza on e-reserve; [www.esa.org/ecoservices/](http://www.esa.org/ecoservices/)

Env. Impact Assessment & Risk Assessment Population Policy, carrying capacity, ecofootprint

Ecology of Food Production N 4 (also 3,5,6) Energy, Carbon and Climate N2, Smith ch 32, CO2 calc

Pest management N 8 Pollution management N 9 Conservation of Biodiversity N 10 & 11

**12/10 \*\*\*\*\*remaining 2 takehome questions due, plus bonus if attempted\*\*\*\*\***

**12/12 wrap up/evaluations (& student presentations if time needed)**

**12/18 10:10-12:10 FINAL SYMPOSIUM** – each team presents its research

**References:** R. Smith's Ecology & Field Biology (or any good ecology text – just read appropo sections)

E. Newman's Applied Ecology & Env. Management

**On reserve:** Cox General Ecology Lab Manual – read chapters 1-4 and rest as needed by your study

Brower et al Field & Lab methods for General Ecology is also a useful reference.

**Grade based on percentage of 1000 points earned****HOW to earn points (maximum possible points shown):**

- 400 pts Take home essays (individual work);
- 400 pts Team Research project:
  - approved proposal 50, progress reports 100, paper 150 , presentation 100+
- 100 pts Field trips or conferences & reports on same (10 pts/hr of field trip)
  - reports due about one week after field trip/conference.
  - See EVST calendar for times. Sign up sheets are on door at M-2 Rankin.
- 100 pts Participation in lecture and at final symposium

**HOW to lose points:** Unexcused absence from field trip once signed up – drop letter grade.

- Leaving mess in lab (cleanup after yourself, discard samples when done; recycle containers).
- Taking equipment without checking it out; taking equipment reserved by others.
- Returning equipment late; not reporting equipment problems/malfunctions.
- Late work – lose ¼ of points on that assignment for each week late.

**ASSIGNMENTS ARE DUE WEEK INDICATED BELOW;**

**Keep a copy of all assignments & assemble in a portfolio for final check.**

**WEEK OF ASSIGNMENTS --**

- 9-5 Turn in survey with your research interests (which project ideas appeal to you?)
- 9-10 Email addresses due (notify us if change); form research teams; email team members to Watson.
- 9-17 Proposal—question(s), target audience, anticipated product(s), design/methods, needed resources
- 9-24 Proposals returned and discussed (keep resubmitting proposal until approved)
  
- 10-1 Revised/expanded Proposals due; Take home essay question 1 is due.
- 10-10 Take-home essay question 2 due *Note: Written comments on Clark Fork cleanup due Oct 13*
- 10-15 Progress Report 1—achievements, problems, changes (apc)
  - also first draft of Introduction/background LitReview/Approach & Bibliography (40 pts)
- 10-22 Intro/Lit review/Approach and Bibliography returned with comments
- 10-29 PR2 –apc; Detailed OUTLINE (at least 2 pages; include full citation of your paper, all subheadings, 1 sentence/pgf: note any stats/graphs/figures to be used (30 pts)
  
- 11-7 outline returned with comments
- 11-12 PR3 –apc; Revised Outline & more complete Bibliography (30 pts)
- 11-19 outline and biblio returned; sign up for presentations
- 11-26 1<sup>st</sup> draft of team research paper (double-spaced) 40 pts
  
- 12-3 draft paper returned (recommend that you turn in at least one of remaining take home questions)
  
- 12-10 Remaining take home questions due; (some student presentations if needed)
  
- 12-12 Final draft of research paper due (single spaced, double space between paragraphs) -- 110 pts; some student presentations; evaluations, portfolio check

12-18 (10-noon) Student presentations at Final Symposium (note Undergrad Symposium in spring)

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 Graduate increment for 360 – graduate students serve as leaders of research teams. They must approve all team assignments before these are given to instructor. If undergrad serves as team leader—can earn up to 100 additional points.

Note – all drafts should be double spaced.

Final versions, exams, biblios –single spaced within paragraphs & citations; double between