

Biology 252-03 – Organisms, Evolution, and Ecology – Spring 2007
Course Information and Syllabus – 23 January 2007

For more detail, see weekly schedules that will be distributed. . . every week.

Course Description – Investigations of the evolutionary causes and ecological consequences of organism structure and function, including studies of why organisms acquire and expend energy, acquire and transport materials, regulate internal conditions, transmit information, reproduce, develop, grow, and move. Student investigations will be linked with those of Biology 251 (Cells, Molecules, and Organisms).*

*Construction constraints will make this course somewhat more independent of Bio 251 than in the past.

Instructor – Vince Eckhart. Office: Science 1210. Research lab (after spring break): Science 1808. You may also find me in the Herbarium, just down the hall from the classroom/lab. Phone: 4354. email: eckhart@grinnell.edu. Office hours: MW 8-10; Th 1-3, and by appointment.

Additional Teaching Staff – Sue Kolbe. <<Mentor: Laura Shannon (2007).>>??

Classroom/Lab Setting – Tues 9:00-9:50 AM, 1:15-4:05 PM, Thur 8:00-9:50 AM; Science 0208. Several field trips to the Conard Environmental Research Area.

Texts – Required: Molles M (2005). *Ecology: Concepts and Applications*, 3rd ed. McGraw-Hill, New York. (Optional). Campbell NA, Reece JB *Biology*. 7th edition. Benjamin/Cummings, Menlo Park, CA. Several copies are on reserve at Burling Library.

Evaluation – Assignments total 700 points. There will be two quizzes worth 100 points each, a final exam worth 150 points, three lab presentations (one individual scientific paper, one group scientific article, and one individual science journalism essay) worth 100 points each; 50 points' worth of small assignments, and 50 points for participation (which means *your* contribution to teaching the class). Final grades will *not* be frequency-dependent, which means that your grade will not depend on how many *others* receive it. An approximate scale will be: > 93% A, 90-93% A-, 87-90% B+, 83-87% B, 80-83% B-, 77-80% C+, 70-77% C, 60-70% D, < 60% F.

Recommendations – Things will go best in this course if you all:

- Are excellent to each other
- Worship *Investigations*
- Start reading assignments early
- Write complete rough drafts of each paper before preparing final versions
- Take notes in class
- Keep a high-quality, up-to-date lab notebook
- Turn in assignments on time
- Are rarely absent (but get formally excused for it if you are absent)
- Attend mentor sessions (research shows they help student performance)
- Ask me for help/advice/feedback outside of class
- Arrive on time, *even* on Thursday mornings at 8:00, and *especially* for CERA field trips

Week by week schedule. (Numbers in parentheses indicate points per scored **assignment**.)

Week	Topics	Investigations	Assignments
2 23-25 J	<ul style="list-style-type: none"> Principles of organism “design” Animal form and function Muscles, skeletons, movement 	<ul style="list-style-type: none"> Jumping biomechanics exercise Scaling exercise 	<ul style="list-style-type: none"> Background reading on muscles and locomotion Scaling readings Jump-scaling article
2 30 J – 1 F	<ul style="list-style-type: none"> Functional morphology and physiology Adaptation and evolutionary history Scientific writing 	Jumping biomechanics projects	<ul style="list-style-type: none"> Regression problems (10) Biomechanics article Background reading on evolution and adaptation
3 6-8 F	Physiological ecology <ul style="list-style-type: none"> Temperature and water relations Phenotypic plasticity 	Acclimation exercise	<ul style="list-style-type: none"> Multivariate stats problems (10) Partial paper (group) peer review (20) Molles chs. 1-5 (<i>start in week I</i>) Biomechanics papers (100)
4 13-15 F	Physiological ecology <ul style="list-style-type: none"> Energy relations Morphology & resource uptake Resource allocation & trade offs 	Plant growth exercise	<ul style="list-style-type: none"> Molles ch. 6 Plant ecophysiology article Quiz 1 (100)
5 20-22 F	Reproduction and genetics	Genetics exercises I (mostly Mendel)	<ul style="list-style-type: none"> Background on reproduction and genetics Genetics article I
6 27 F–1 M	Genetics <ul style="list-style-type: none"> Mendelian genetics Quantitative genetics Molecular basis of inheritance 	Genetics exercises II (beyond Mendel’s dreams)	<ul style="list-style-type: none"> Background on genetics (and review 251 material) Genetic stats problems (10) Genetics article II
7 6-8 M	Population genetics <ul style="list-style-type: none"> Equilibrium population genetics Evolutionary “forces” 	Evolutionary forces exercises	<ul style="list-style-type: none"> Molles ch. 8 Microevolution article Speciation article
8 13-15 M	Ecological genetics/evolutionary ecology	Natural selection on gallmaker flies <ul style="list-style-type: none"> Field sampling 	<ul style="list-style-type: none"> Quiz 2 (100) Molles ch. 14

SPRING BREAK

9 3-5 A	Population and evolutionary ecology	Natural selection on gallmaker flies <ul style="list-style-type: none"> Data analysis 	<ul style="list-style-type: none"> Molles chs. 9-10 Gallmaker fly article
10 10-12 A	Population ecology, demography, and life history	Population dynamics exercises	<ul style="list-style-type: none"> Molles chs. 11-12 Senescence article Gall selection papers (100)
11 17-19 A	Species interactions; community structure	CERA forest fire experiment	<ul style="list-style-type: none"> Molles ch. 13, 15, 16
12 24–26 A	Community structure Ecosystem dynamics	CERA: Community structure and carbon dynamics exercises I	<ul style="list-style-type: none"> Molles chs. 17-18 Food web article
13 1–3 M	Carbon dynamics Non-fiction science writing	CERA: Community structure and carbon dynamics exercises II	<ul style="list-style-type: none"> Molles chs. 19-21 Prairie carbon dynamics article
14 8–10 M	Synthesis and integration	Community structure & carbon dynamics presentations	<ul style="list-style-type: none"> Integrative biology article Science journalism essay (100)

Final exam: Thursday 17 May, 9:00 P.M. (150)