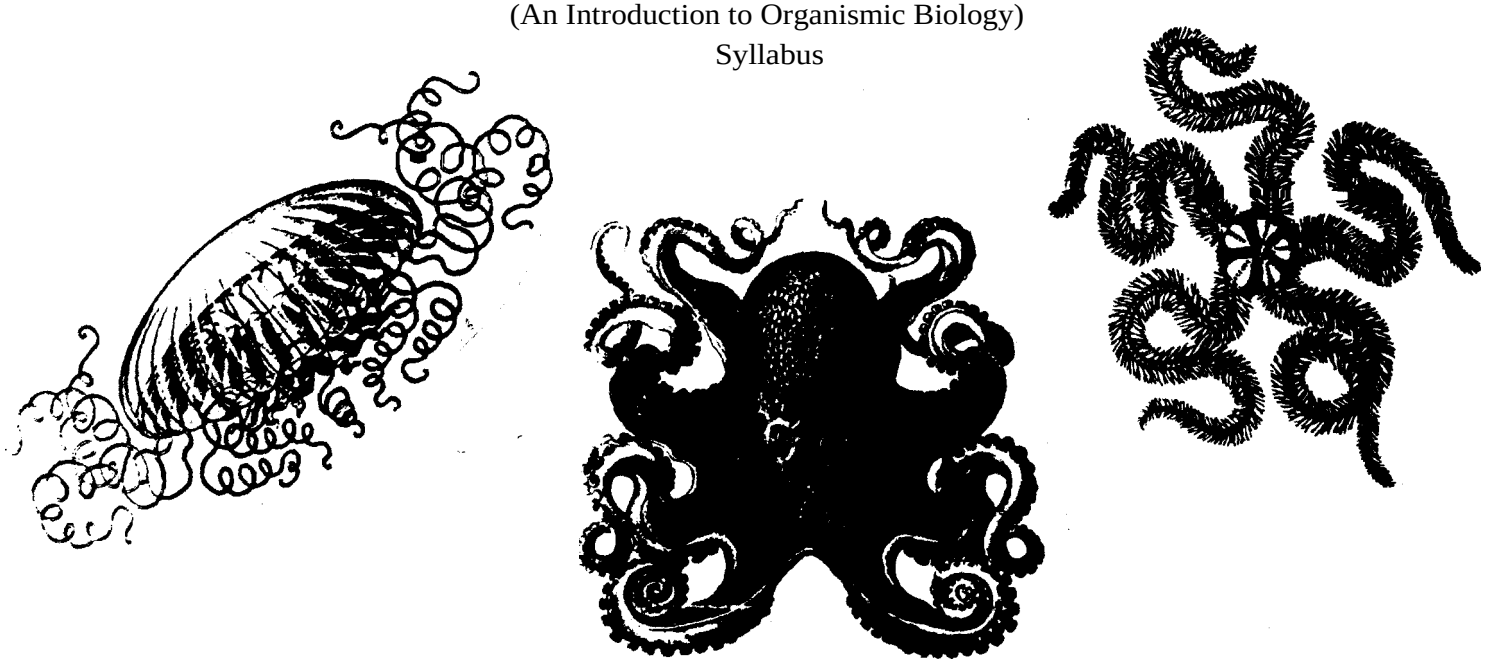
Bio 102: General Biology 11
Dr. Gail Grabowsky **Kaaialii**
Office hours: TTh 9:30 -11:30; Th 2:00 - 5:00; W 3:00 - 5:00
For appointments & questions call: 735-4807/922-3487 (before 9:30 pm please!)
E-mail: gkaaiali@chaminade.edu

Biology 102: **General** Biology 11
(An Introduction to Organismic Biology)
Syllabus



Biology is the study of every kind of living thing on Earth.... We seek to unlock nature's secrets, answer such questions as, "How does life arise?"; "How long has it been around?": "Why does it behave the way it does?" Answers to these questions get at the very nature of the brief existence of human life in **this universe**. To help **understand** how we fit into the grand scheme of the universe, we seek to find out how we came to be what we are.

Charles Wynn & Arthur Wiggins
The Five **Biggest** Ideas in Science

We need another and a wiser and perhaps a more mystical concept of animals. Remote from universal nature, and living by complicated artifice, man in civilization surveys the creature through the glass of his knowledge and sees thereby a feather magnified and the whole image in distortion. We patronize them for their incompleteness, for their tragic fate of having taken form so far below ourselves. And therein we err, and greatly err. For the animal shall not be measured by man. In a world older and more complete than ours they move finished and complete, gifted with extensions of the senses we have lost or never attained, living by voices we shall never hear. They are not brethren, they are not underlings; they are other nations, caught **with ourselves** in the **net of** life and time, fellow prisoners of the splendor and travail of the **earth**.

Wolfgang Lederer

Nothing in biology makes sense, except in the light of evolution.
Theodosius Dobzhansky

Course Schedule

Date	Topic	Reading
1/18/00	Introduction to the course; Course mechanics; Course objectives and design	Chapter 14 in Audesirk & Audesirk
	Lab 1: Introduction to evolution and the creation of biodiversity. Lab write-up due 1/25/00.	Handout(s)
1/20	Science; Science as a human endeavor; Things all life shares; The history of evolutionary thought	pp. 254-263
1/25	Evidence of evolution	Chapter 15 pp. 263-269
	Lab 2: Evidence of evolution lab Worksheet due 2/1/00.	Handout
1/27	Causes and mechanisms of evolution	pp. 272-280
2/1	Change via natural selection; Extinction	pp. 281-291
	Lab 3: Mechanisms of evolution lab Handout due 2/8/00.	Handout
2/3	Species concept; Speciation	Chapter 16 pp. 294-308
2/8	Creating life and biodiveristy; The origin of life; The origin of multicellularity	Chapter 17 pp. 310-320
	Lab 4: The "simpler" organisms Worksheet due 2/15/00.	Handouts
2/10	Invading land; Human evolutionary history	pp. 320-333
2/15	Systematics and the kingdoms of life	Chapter 18 pp. 336-347
	Lab 5: Taxonomic methods and the multicellular Kingdoms of life. Worksheet due 2/22/00.	Handouts
2/17	Evolution wrap-up; Implications for human societies (Disscussion)	Two outside readings passed out by Dr. Gail
2/22	EXAM 1	

	Lab 6: Biodiversity survey-in-the field lab. Handouts due 2/29/00.	Handouts
2/24	Basic organismal design: The **"products"** of evolution; Plant design	Chapter 23 pp. 450-465
2/29	Plant function You must have chosen your topic for the Evolution paper by TODAY and have turned topic idea in to Dr. Gail!	pp. 466-477
	Lab 7: Plant form & function. Lab handout due 3/7/00.	Handouts
3/2	Animal design: Homeostsis	Chapter 26 pp. 521-526
3/7	Animal tissue types and their *functional integration*	pp. 526-533
	Lab 8: Animal tissue types and organ systems Handouts due 3/14/00.	Handouts
3/9	Animal circulation: features and *functions*	Chapter 27 pp. 536-543
3/14	Blood and blood vessels	pp. 543-551
	LAB PRACTICAL I	
3/16	Animal respiration	Chapter 28 pp. 556-567
3/21	Animal nutrition and digestion: Needed nutrients	Chapter 29 pp. 570-577
	Lab 9: Integrated functions lab: Circulation, respiration And digestion. Handouts due 4/4/00.	Handouts
3/23	Digestion	pp. 577-588.
	SPRING BREAK -- NO CLASSES	
4/4	Animal action and support: muscles and skeleton	Chapter 34 pp. 692-702
	Lab 10: Muscle and skeletons lab. Handout due 4/11/00.	Handouts
4/6	A closer look at muscle function	Handouts

4/11	Animal behavior: Nature versus nurture; Communication	Chapter 37 pp. 758-769
	Lab 11: Animal behavior lab. Worksheet due 4/18/00.	Handouts
4/13	Social behavior; Sociobiology	pp. 769-785
4/18	EXAM II	
	Lab 12: Introduction to ecology lab. Worksheet due 4/25/00.	Handouts
4/20	Introduction to many organisms living in the field: Ecology	Chapter 38 pp. 790-801
4/25	Populations: Growth and distribution	pp. 801-807
	Lab 13: Population growth lab. Worksheet due 5/2/00.	
4/27	Communities and the interactions within them: Competition, predation, symbiosis	Chapter 39 pp. 812-822
5/2	Community structure; Succession	pp. 824-830
	LAB PRACTICAL II	
5/4	Ecosystems; Evolutionary ecology Service learning reflection OR Evolution paper DUE TODAY	Chapter 40 pp. 834-844

Final Exam: Tuesday, May 0 from 12:45 - 2:45 PM in HH17.

Already-Scheduled Service Learning Trips:

1/22	Sierra Club: Miconia eradication
2/12	The Nature Conservancy: Fieldwork
2/26	The Nature Conservancy: Fieldwork
3/11	The Nature Conservancy: Fieldwork
3/25	The Nature Conservancy: Fieldwork
4/8	The Nature Conservancy: Fieldwork
~4/15	Kai Makana: Marine Debris Clean-Up and Quantification
4/22	The Nature Conservancy: Fieldwork

A Short Written Reflection for the Service Learning portion of the Course (if you participated) is due on May 4.

Course Information

Required Text:

Audesirk, T & G. Audesirk. 1999. Biology: Life on Earth. 5h ed., Prentice Hall, Upper saddle River, NJ. They have a complimentary website @: http//www.prenhall.co./audesirk

Other Readings and Exercises from: (These will be provided to you)

Haught, J.F. 1995. Science and Religion: From Conflict to Conversation. Paulist Press, New York, NY.

Keck, R. W. & R. R. Patterson. 2000. Biomath: Problem Solving for Biology Students. Addison Wesley Longman, Inc. San Franscisco, CA.

Wynn, C. M. & A. W. Wiggins. 1997. The Five Biggest Ideas in Science. John Wiley & Sons, Inc. New York, NY.

Introduction:

This course consists of roughly 28 lecture/discussion periods and 13 laboratories. There will be two 75 minute lecture exams, a 75 minute final exam and two laboratory practicals. You will also either: participate in four service-learning trips OR complete a research paper on some topic related to evolutionary biology. I will further explain the nature of the exams, practicals, service learning, evolution paper and the grading policy ill this introduction as well as immediately prior to each as the class proceeds. You will be earning separate grades in this course: one for your performance in the labs and the other from the lecture portion of the course.

I am NOT the worlds toughest grader, BUT, I do expect you to rise to challenge of this course -- and enjoy yourself doing so. By this I mean that there will be a lot of material; biology is a huge field! And, I will not be making the material "easy". My job is to make the material interesting (which it is already) and understandable (which it may not be at this point to many of you!). I reward you for your ***efforts*** to learn this complex, voluminous and interesting stuff by NOT being a "bear" when it comes to grading. In other words your efforts will *be rewarded!*

Please ask questions AT ANY TIME DURING LECTURE. You do not have to raise your hand as I may be writing on the board at the time your question comes to mind, so just "holler" out any question. I prefer the class to feel like a seminar in which you may ask any relevant question or make a comment at any time during lecture/lab. We all learn from each others experiences/thoughts.

The only dumb question is the one you don't ask!!!

Subject of the Course:

This course introduces you to what is sometimes called "organismic" biology: that is, we will be studying the biology of whole organisms. In BI 101 we study the parts of organisms: molecules, organelles, cells. In BI 102 we study the whole organism: its integrated organ-systems, its history (evolution), its interactions with the environment and other organism (ecology). You DO NOT have to have taken BI 101 to be enrolled in BI 102: you can learn about critters by first studying the tiny parts that make them up (the "bottom-up" or reductionistic approach to organisms) OR you can start learning about critters by studying their variety (biodiversity) and how they all got here and live together (the "top-down" or non-reductionistic approach to organisms).

In this class we will take a top-down approach. We will first study what scientific inquiry has taught us about how organism got here and how their diversity came to be. This does not, in my opinion, necessarily eliminate God or a spiritual aspect from organisms or creation. In fact, some people think evolution sheds light on the wonders of creation. One of the coolest things about college is that we can discuss what science is, if science can allow-for a God, if God can be part of evolution, ETC! We get to THINK and hear other people's ideas and formulate ever more sophisticated, enlightened, mature, experienced, fortified concepts of our world. Once you start this process its infectious and you'll be

doing it: growing, all of your life. So come in with your thoughts and beliefs and be ready to share, integrate, question and grow.

So, we will start the course by talking about how organisms got to be the way they are. We will look at what science has taught us about the answer to this question but we will not ignore all the very human aspects of such considerations.

Once I have introduced you to the origin of life and biodiversity via evolution, we will take a closer look at how plants and animals are designed. We will be able to see the common aspects of the design of all plants (and animals) as the result of their **shared** evolutionary past. We will also consider how each species has its unique aspects - ways in which it alone has evolved adaptive variations that allow it to meet the demands of the physical world and the requirements for life.

Finally we will consider how all of the various groups of organisms live together and interact with each other and the world around them to form ecosystems. We'll learn about the way ecosystems work and the way they come to be and change through time.

Course Objectives:

When a student completes this course they should:

- Understand what science is and how it is done
- Gain first-hand experience doing science
- Understand what science has taught us about the origin of biodiversity
- Understand the mechanisms that create biodiversity
- Understand the basic design of plants and animals and understand some of the integrated functions that maintain life in these two groups

Understand what an ecosystem is and whit goes on, in general, in all ecosystems

- Be comfortable integrating scientific knowledge with faith beliefs and in so doing experiencing personal and intellectual growth
- Be more of an intellectual than when they started the class: enjoy the process of learning and be motivated to do it the rest of their lives

Pace of the Class:

This class will proceed at a rapid pace. Please come prepared to absorb the material like a poriferan (sponge)! If I go TOO fast do not hesitate to (try to) slow me down!

Biology is a wonderfully interesting, BIG field. There is a lot to learn and integrate.

Helpful Hints:

1. Buy a pen with more than one color ink or bring a number of different colored pens. You'll need these to help you distinguish what's what on your drawings.
2. Study with a friend. Biology is a science. Pieces of information fit together to create one (fairly) logical reality. Studying out loud with a friend can help you realize what does and does not make logical sense to you. If it doesn't make sense then you are probably misunderstanding something and should see Dr. Grabowsky Kaaialii so that she can help de-mystify whatever it is that is confusing you.
3. Take thorough notes. Write down whatever you can. If it gets written on the board it should get written in your notes.
4. Memorize those new biological "jargon" words. They may seem cumbersome at first but they have specific meanings and are very useful.
5. Keep up with the reading. **Biology** builds on itself, if You **keep** up with the reading all should fall into place as we proceed.
6. Keep a neat notebook. Don't just smash and crumple your papers into a folder - keep them in time-order, put a date on each sheet in case they get out of order. If it hepls you to do so, re-copy your notes after class.

7. Be creative: learn how YOU learn and ever improve upon the things you do to aid in your own learning process. Figure out what helps YOU most and do it.
8. Save all the handouts I give you and keep them with the notes that they are relevant to. Study these along with your notes when you prepare for an exam.
9. Come see your instructor whenever you have questions. Do not be shy!

Attendance:

While you are expected to make every class, since you are adults now, you are free to miss any class you choose ... with some consequences should you choose to exercise this option: your grade will *suffer!* Excused absences will not effect your grade. Excused absences occur when you bring in a doctor's note, a funeral announcement for a family member, etc. Excused absences can occur for: participation in athletic events, death in the family, illness, extreme personal stress, and on rare occasion, an emergency fill-in at your job ("but Dr. Gail they just couldn't find anyone else to do it!"). Unexcused absences occur when you were working, surfing, sleeping, cramming for an exam in another class (which means you need to pay good attention on the day that we discuss time management!), etc. If you are more than 5 minutes late for class you are marked absent.

Unexcused absences from lecture will not effect your grade directly, meaning you simply get marked absent. I have noticed over the years however that missing lecture definitely has an effect on your performance! So do Yourself a favor and give yourself an opportunity to do the best you can do by coming to class! Paddling analogy pertaining to this: don't bail water into your boat - come to class!

Unexcused absences from lab have defmite material repercussions - you get a zero in that lab! If you are going to have an excused absence remember to bring a note and it is a good idea to call me prior to class and let me know you'll be missing lab.

Athletes -- if you have to miss for a game or travel let me know prior to your absence.

Classroom Atmosphere:

Guys, I value a very open, yet courteous class atmosphere. Express your ideas! Ask your questions! (The only dumb question is the one in which you ask yourself if you should ask your question!) Respect the thoughts and ideas and opinions of others - really think about what others say. Let them fully express their thoughts and ideas and then you do the same. The thing I value most from my college days are all the wonderful, valuable, diverse ways of looking at and understanding the world that I was **exposed** to. Be an open vessel - take ideas in! You will learn as much from each other as you do from me.

Exams:

Exams will be given during the first hour and fifteen minutes of lecture. If you miss an **exam** you will receive a zero for it unless you have an incredibly good, verifiable excuse. If you have a good, excuse then an alternative time for you to take the exam can be arranged. No exam scores will be dropped. Exams will be graded on a curve. The final is cumulative and strictly multiple choice. Exams 1 & 2 will contain a variety of types of questions including: multiple choice, true or false, matching, fill-in, short answer, essays and diagramming. Each exam will be preceded by an accompanying review sheet.

Service Learning:

If you'd like you may choose to do some hands-on, ***meaningful*** whole-organism biology in the real world through what is called "service **learning".** Service **learning** means that you (1) learn physiology (2) in our community, all the while (3) doing some good for man or man and nature. Pretty neat idea huh? Actually its a practical, intelligent, useful, lasting way for you to learn. The emphasis is on learning biology, the twists are that you do it in the real world and that you can feel good (because you are doing something good for the community) about it.

If you decide you'd like to do service learning then you have to participate in FOUR service **learning** trips. These are usually on Saturdays and they last from roughly 8:00 am to 2:00 pm.

Service learning is very fun, real-world educational and hard work. We clear hiking trails, plant native plants, eradicate pest plant species, etc. I will provide transportation to each service learning event. If you do four service learning activities than you DO NOT have to do the evolution research paper and you are guaranteed an "A" for this portion of the course.

Think about if you'd like to do service learning. I will be asking you for your decision during the first two weeks of class.

Evolution Research Paper:

I will be giving you a separate handout about this. Basically, if you do not do the service learning then you will be writing a 10-page paper on some topic of your choosing relating to evolutionary biology. Once we finish the evolution section of the course you will be asked to choose your topic for your paper and run it by Dr. Gail for approval. This is a research paper so you'll need to look into at least three outside sources of information for your paper. The paper is due the last day of class (May 4, 2000).

Grading:

Your grades in lecture and lab will be based on the following: (If you are only in one of the two just consider the one you are in.)

Lecture Grade:

Exam 1	25%
Exam II	25%
Final Exam	25%
Evolution Paper/Service Learning	20%
Participation	5%

Lab Grade:

Lab write-ups, worksheets, problems, papers	50%
Lab Practical I	25%
Lab Practical II	25%

The instructor reserves the right at all times to deviate from this syllabus. Biology is a four-dimensional process and so is this course: both "unfold" in time. I will notify you of any deviations as soon as I become aware of them!

BI 102, Spring 2000
Dr. Gail L.G. Kaaialii

BI 102 Questionnaire

Everyone--

I am asking you to answer these questions so that I may determine (1) why each of you is taking this course, (2) what kind of biology background you have, (3) what you would like to take away from the course -- what are you interested in learning and why, and (4) how much you learn between the first and the last day of class.

Please answer each of the following in the space provided.

1. Why are you taking this course?

2. How much biology/health science have you had in school (junior high, high school, college, other vocational school) prior to now?

3. What do you hope to learn in this course?

So that I may learn something from you , please complete the following

1. In my opinion good teachers/instructors.... (what's something that, in your opinion, good instructors do that makes them effective)

2. I really dislike it when teachers/instructors.... (what's something that, in your opinion, makes an instructor ineffective)

Finally, just a few specific BI 102 questions so that I can see what you've been taught already:

1. Define evolution:

2. What do we believe is the major mechanism of evolutionary change? (Hint: it was first verbalized by Charles Darwin.)

3. What is a Kingdom?

4. What are the functions of your circulatory system?

5. What is the function of phloem in plants?

6. What is an ecological niche?

7. What is a keystone species?

8. Give an example of an animal characteristic that may have been created by sexual selection:

9. Briefly explain the difference between an innate and a learned behavior:

10. How might you design an experiment to **determine if birdsong is an innate or learned** behavior?