BIOL 113A/C (Fall 2014): Evolution and Diversity (3 credits)

Course Website: `http://johnmischler.com/Kings113Bio.html`
Lecture-MWF (Sec A: M211 8:00-8:50; Sec C: M213 9:00-9:50)
Problem Hour-T (Sec A: M211 8:00-8:50; Sec C: M211 10:00-10:50)
Instructor: John Mischler, Assistant Professor of Biology
Office Hours: Wednesday 10:00 am to 1:00 pm or by appointment
Email: johnmischler@kings.edu **Office:** Mulligan 101 **Phone:** 208-5900 x5718

Required texts:
Lecture: Reece JR et al. 2014. Campbell Biology. 10th ed. San Francisco, CA: Benjamin Cummings
Lab: Pechenik JA. 2013. A Short Guide to Writing About Biology. 8th ed. Pearson. New York, NY.

Course Materials: The course schedule (tentative and subject to change), lectures, announcements, list of topics, reading assignments, handouts, syllabus, and all other materials can be found on the course website: `http://johnmischler.com/Kings113Bio.html`

It is extremely important that you keep checking the course website because as we go on in the semester, the schedule may change or assignments may be added. This website will help you stay organized.

Course Tone and Welcome! How are all the different kinds of dogs we see today descended from a recent common ancestor? Why are fungi not considered plants or animals? How does pesticide-resistance or antibiotic resistance develop? If my mom has red hair why don't I? These are all situations that we are confronted with every day. In this course (BIOL 113: Evolution and Diversity) we will equip ourselves with the knowledge necessary to answer these kinds of questions; those that may crop up in our daily experience. You will not be memorizing and echoing back facts, but instead be building your own conceptual understanding of Evolution and Diversity that you can take with you wherever you go. You will learn to think like a scientist...to think deeply and critically to cultivate a deeper understanding of biological systems and solve biologically-relevant problems. In addition, this course is the foundational course in evolution and diversity here on campus that will help you equip yourself to tackle higher-level courses across the sciences. I am here as a coach and mentor. My role is to provide you with the exercises and framework within which you will train to master the material. Ultimately, your learning success is dependent on your own work ethic, determination, and commitment.

Course Description: This course will start with the basics of Mendelian inheritance. Because genetics will be covered in depth in a later course, the goal here is to highlight the information that is necessary for students to understand evolution, focusing on the results of relevant processes rather than their details. A brief introduction to inheritance, sexual lifecycles, mitosis and meiosis, and DNA transcription and translation should lay the foundation for students to fully understand evolution of populations through natural selection and adaptation, the origin of species, and the history of life on Earth. Evolution will continue as a major theme throughout coverage of the diversity of life, focusing on shared and derived traits within taxa and highlighting relationships between form and function in preparation for BIOL 210.

Course Goals:

- To introduce students to the study of evolution and the diversity of life
- To encourage a strong understanding of natural selection and adaptation and how this process led to the diversity of life forms on Earth
- To reinforce students understanding and familiarity with the process of science
- To reinforce / expand students' information literacy, including their ability to access relevant literature and their familiarity with common forms of written communication in the sciences
- To improve students ability to effectively communicate, in written and/or oral form, their understanding and engagement with the biological sciences

Course Objectives: At the end of the course, students will be able to:

- Master course material on evolution and ways scientists make new discoveries in relevant fields
- Master course material on the diversity of life on Earth and the ways scientists make new discoveries in relevant fields
- Efficiently use databases to access scientific literature (peer-reviewed and non) and evaluate the relevance of the sources to a research goal
- Recognize the common forms and formats of peer-reviewed scientific literature
- Identify the purpose of a research article, understand the methods and experimental design at an appropriate level, recognize the main results of the study, and interpret the meaning of the results in light of the study's purpose
- Clearly articulate the process by which scientific knowledge is advanced, including recognition of: inductive and deductive approaches to science; basic experimental design; and the differences among hypotheses, theories and laws
- Articulate how evolution, the core theme of biology, relates to course material
- Effectively communicate, in written and/or oral form, their understanding and engagement with material relevant to the course
- Construct arguments based on evidence
- Collaborate with people of varying knowledge and points of view toward common goals
- Communicate for brevity, clarity, and scientific persuasion

Emphasis on Critical Thinking: A survey of employers resulted in a list of the five most important characteristics of successful individuals:

- Ability to work well in a team
- Ability to communicate effectively
- Ability to solve problems
- Ability to obtain and process information
- Ability to plan, organize and prioritize

This list matches a similar list generated by asking college-level biology students what they wanted to get out of their undergraduate education. This course is designed, as much as possible, to advance the development of these characteristics.

General Approach: This course is built around research-proven educational methods that emphasize student-centered active learning. I will use a variety of teaching approaches that will require a considerable amount of work and interaction from you in and out of the classroom. My

intention as your professor is to be challenging, yet fair. As such, each student is responsible for taking an active approach towards their learning and will be held responsible for mastery of concepts and materials. All students will have access to me both in and out of class and are also encouraged to utilize tutoring services on campus (`http://www.kings.edu/academics/support/skills_center`). In addition, students will be placed within collaborative learning groups to learn from each other while working through the material. A good test of your understanding of material and concepts is your ability to explain it to other students. While the material and concepts covered in this course will be an important foundation for later (and more rigorous) courses, we will also reflect on the ethical, social, and political implications of the material to extend its utility beyond the classroom. Students will be expected to read the book and watch assigned lectures and videos outside of class in order to be fully prepared for collaborative work in class. Students will be quizzed regularly on their preparedness at the beginning of class to ensure all students can learn and contribute to their full potential.

Groups and Group Products: The heart of many of the activities in class will involve your performance in a small group. There are several rules that apply to all work done by team members.

- Each person is responsible for making sure all team members participate.
- Assist each other as much as possible and to the best of your ability
- Engage with each other, not with forms of communication that take your mind away from the group (e.g. email, Facebook, surfing the web, etc.)
- For group activities in class, each group prepares a single product. Each team member needs to sign the product, thereby indicating you agree with the conclusions, contributed to the product, understand its contents, and will take responsibility for the product.

Attendance Policy: Attendance is mandatory, and participation should be an important part of your learning in this course. I expect students to be present at each class and to be on time. Quizzes will be administered at the exact beginning of class and no extra time will be given to students who are late. There are some college-sanctioned activities from which a written excuse from class may be obtained. Notify me before the absence so we can discuss relevant material and assignments; also check with classmates about missed material and assignments. It is at my discretion whether other absences will be excused.

During inclement weather or for special events, classes may follow a compressed schedule. In such cases, this class will typically start at 10:00 (sec A) / 10:45 (sec C) and run for 35 minutes. For class cancellations, call the King's College Snowline at 208-5979.

Class Participation: Come prepared to learn. You will get much more from this class if you take responsibility for your learning. Keep up with the material, read the reading-assignments thoroughly (and maybe more than once), prepare for quizzes, and complete writing assignments on time. Your participation in class begins with being present at the start of class and continues throughout the class period by asking questions, responding to questions, and participating in class discussions while avoiding distractions (online, etc.).

*Students with documented disabilities who may need academic accommodations should see me during the first two weeks of the semester.

Academic Integrity: Kings College has an Academic Integrity Policy. Read it. In short, you should not do work for others or present the work of others as your own. Please consider this policy as seriously as I do; violators will be reported to the Academic Integrity Officer.

Academic Support Services: King's college offers a number of academic support services for students. These services are provided free of charge will benefit students at all levels (`http://www.kings.edu/academics/support/skills_center`).

- Learning Strategies Workshops - each semester, a series of workshops are offered to enhance student learning: Planning for Success, Note-taking Skills, Whats Your Learning Style?, Objective Test Skills, Last Chance Study Tips are among the workshops offered.
- Writing Center- professional and peer tutorial assistance is available on a walk-in basis for students who wish to further develop their writing skills. Assistance with essays for exam purposes, term papers and other course assignments is available. A schedule of staffing of the writing center will be posted. The writing center is located across the hall from MU-90.
- Tutoring Program- the King's College Tutoring Program is certified by the College Reading and Learning Association (CRLA) and provides tutoring in three modalities: individual, small group and walk-in labs. For tutorial assistance consult the tutoring office located in the Learning Skills Center, MU-94.

Coursework and Assessment: Remember, I will administer in-class assignments or quizzes often, and without warning, to make sure everyone is keeping up with necessary content. Quizzes will be administered at the exact start of class and students who are late will not be given extra time. Your final grade will consist of four components: exams, quizzes, in/out of class assignments, and participation.

Exams: There will be four tests (multiple choice - with possible multiple answers, True/False, and short/medium answer) throughout the course. While each test will be predominately made up from material covered after the previous test, each test will also contain some content covered by previous tests (so each test is partially cumulative). Each student will have the option to drop one of their first three tests. If a student chooses to keep all four tests, they will each be counted equally towards their total test grade. If a student decides to drop one of their first three tests then the fourth test will count double (essentially replacing the dropped test). You must email me by November 25th to let me know which option you will opt for. Under most circumstances there will be no make-up tests offered.

Memorizing facts is not all you need to do well in this class. I want you to understand and think about the material and concepts covered during this semester. A deeper understanding of this introductory material will serve you well in future courses and experiences. Questions on Exams will take a variety of forms:

- Multiple choice and short answer questions will be designed to test your knowledge base. A working knowledge base is required in any discipline. Unless you have a growing knowledge base, understanding new concepts and applying new information to existing information, models, etc, will be difficult.
- Other questions will measure your comprehension of a process or principle by testing your ability to apply information to new situations.
- Some questions will focus on your ability to interpret data presented in tables or graphs.
- I may ask you to draw and/or label pictures or diagrams that illustrate concepts or models.
- I may present short paragraphs, containing biological information, observations and/or data and ask you analyze, interpret, or otherwise comment on the information presented; such questions also require you to think critically and write in an acceptable manner.

Quizzes: Quizzes will be very diverse and will be administered at the exact beginning of class. They are meant to keep all students accountable for completing out of class assignments and readings/videos. I will automatically drop the four worst quiz grades for each student when computing final grades. Therefore, any unexcused class absences will be treated as one of these dropped quizzes. Under most circumstances there will be no make-up quizzes offered.

In/Out of Class Activities: In addition to individual assignments, we will use various activities in class to be completed collaboratively (discussions, concept maps, case studies, problem sets, etc). Each group will hand in a single product. I will also use reflection papers of varying lengths periodically to assess how everyone is thinking about both the content and the progress of their own learning.

Participation: I will assign participation points as appropriate for attendance, group participation, and explicitly-stated short in-class assignments.

Grading: I grade on a standard grading scale:

A	93-100	B	83-86	C	73-76	F	$\downarrow 65$
A-	90-92	B-	80-82	C-	70-72		
B+	87-89	C+	77-79	D	65-69		

...with the following relative contributions:

50%	Exams
25%	In-Class and Out of Class Assignments
5%	Class Participation
20%	Quizzes

The following criteria, taken from the Kings College Academic Policies Handbook, will be used to help determine letter grades for the course. The components of the course and proportion of the grade determination for each component is described below.

- A and A-: These grades reflect exceptional interest and mastery of subject matter; the student has displayed initiative and creativity as well as superior insight in analyzing problems and synthesizing subject matter, and also manifests exceptional ability in integrating and applying this knowledge to other disciplines.
- B+, B, and B-: These grades indicate evidence of intelligent fulfillment of course requirements; the student has demonstrated marked ability to communicate and apply more than merely the basic elements of a course and his or her initiative reveals unusual ability to generalize about course material and displays a marked degree of independence. A B+ is used to indicate notable achievement of these goals.
- C+, C, and C-: These grades indicate a satisfactory grasp of course content; the student can apply and express basic concepts intelligibly and has shown no measurable deficiency in meeting requirements of the course work. A C+ is used to indicate notable achievement of these goals.
- D: The grade of D indicates only passable achievement on course work and indicates areas of deficiency in basic course content; the student has fulfilled the minimum requirements of the course, thus making a failing grade unwarranted.
- F: The grade of F indicates deficiency in so many elements of a course that the students understanding of the course content is substantially impaired. The course must be repeated before credit can be obtained.

Expectations:
My Expectations for You: I will do my best to make my expectations of you very clear. Here are a few of them:

- Be prepared: complete the material before class
- Be respectful: come to class on time; treat your peers in a professional manner
- Stay on task: an important factor that explains variation in learning gains among students is focus on the problem. Distractions compromise learning.
- Be collaborative: work with your peers and try out your critical thinking and communication skills on your peers.
- Be honest: cheating and plagiarism will not be tolerated and if detected may result in an F for the course.

What You can Expect from Me: I will be here for you and will bring my knowledge of biology, my enthusiasm for the subject and for learning, and my experience as an educator and a researcher to the class every day. I am very committed to teaching and would love nothing more than to have all students earn the highest possible scores in this course. More specifically, I will, as much as possible:

- be fair
- be transparent about my expectations of you and your work
- be communicative and available to you to talk about the subject or anything you want to talk about
- provide you with cognitive challenges that advance your critical thinking and science-as-a-way-of-knowing skills

Online sources for supplemental information:

1. `http://www.merlot.org/merlot/index.htm` * information about a variety of science areas
2. `http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/` * online text including links to a variety of topics
3. `http://ocw.mit.edu/index.htm` * MIT site that provides material from their courses
4. `http://tolweb.org/tree/` * the Tree of Life web project is a great source for broad information about biological diversity, its evolutionary history, and taxon-specific details.
5. `http://www.vadlo.com` * a search engine for finding information related to biology research
6. Also, take advantage of the online material that is associated with your text book.