

Colonnade Program Course Proposal: Explorations Category

1. What course does the department plan to offer in Explorations? Which subcategory are you proposing for this course? (Natural and Physical Sciences)

Biology 121 Biological Concepts: Cells Metabolism and Genetics Lab

Note: This laboratory fulfills the foundational requirement of a laboratory experience in the sciences.

2. How will this course meet the specific learning objectives of the appropriate subcategory. Please address **all** of the learning outcomes listed for the appropriate subcategory.

1. Demonstrate an understanding of the methods of science inquiry.

Through laboratory exercises, quizzes, homework assignments, in class and/or online exercises and examinations in which an understanding of the methods and approaches to science is assessed.

2. Explain basic concepts and principles in one or more of the sciences.

This is accomplished through laboratory material, electronic modules that include comprehension assessment and discussions in the laboratory.

3. Apply scientific principles to interpret and make predictions in one or more of the sciences.

Through online modules and in lab problems often based on case studies, students work singly and in groups to create and examine scientific hypotheses and predictions.

4. Explain how scientific principles relate to issues of personal and/or public importance.

The ability to acquire and evaluate information, think critically and assess the source of information are all important skills for global citizens. The principle topics in this course include scientific method, critical thinking, cell theory, genetics, evolution, metabolism and energy flow. These areas provide foundational information for human and environmental health issues that affect people across the planet. This is a required course for biology majors and thus the principles are illustrated by and apply to all life forms on Earth.

3. Syllabus statement of learning outcomes for course. NOTE: In multi-section courses, the same statement of learning outcomes must appear on every section's syllabus.

This course fulfills the Natural Science Explorations Category of Colonnade. Students will gain the ability to:

1. Demonstrate and understand the methods of scientific inquiry in biology
2. Explain basic concepts and principals in biology
3. Apply scientific principles to interpret and make predictions in biology
4. Explain how scientific principles relate to issues of personal and/or public importance

4. Brief description of how the department will assess the course for these learning objectives.

We will create a summative assessment with questions that target each of the four learning objectives listed above. There will be ten questions for each objective with a satisfactory score of 70%. This assessment will be executed via Blackboard at the end of the course for all sections. The laboratory course BIOL 121 is a co-requisite for BIOL 120. Some of the question categories below overlap with the course but others are specific to the laboratory experience.

Objective	Assessment Question Categories
the methods of scientific inquiry	• Steps in the scientific method and their order • Composition of each step • Relationship of scientific method to hypothesis formulation and writing in biology • Inductive and Deductive reasoning – identification and role of each and the related concept of falsification • Evaluating the scientific validity of information gathering including related topics of beliefs, biases and models • Units of measurement in science
basic concepts and principals	• Critical Thinking & Scientific Method • Cellular Transport • Biochemistry – catalysts, macromolecules • Cellular Respiration • Photosynthesis • Cell Cycle, Mitosis, Cancer • Mendelian Genetics
scientific principles: interpret / make predictions	• Aligning principles, hypotheses and predictions • Experimental design • Variables, data presentations and data interpretation • Evaluation of hypotheses and theories • Formulating of hypotheses and predictions
relate to everyday life	Based on the major concepts/principles shown above, applications to: • Human health • Environmental / food related issues • Problem-solving • Sustainability • Technology

5. How many sections of this course will your department offer each semester?

We offer approximately 13 sections on Main Campus and at the WKU-Glasgow campus.

6. Please attach sample syllabus for the course.

Please find a generalized syllabus without any individual instructor information.

Please send your proposal to: robert.dietle@wku.edu

As of September 2013 to: molly.dunkum@wku.edu

Explanation for why the Department of Biology is requesting this course should be listed in the Natural Science Explorations Category of Colonnade along with other courses offered by the Department of Biology:

While our Biology 114/114C is the standard, broad-based, introductory biology laboratory course that covers basic biological concepts and processes, our BIOL 121 laboratory course focuses on cells, metabolism and genetics at a greater depth than is covered in general biology lab course. As part of this lab course, we cover the methods of scientific inquiry, relevant concepts and principals, the application of the scientific method to this area of biology and we explain how this material relates to topics of personal importance. This course is open to any WKU student also enrolled in BIOL 120.

WKU Generalized Syllabus for BIOL 121- Biological Concepts: Cells, Metabolism, and Genetics Lab

Lab Manual: Laboratory manuals (*Biological Concepts -2013*) can be purchased at the WKU Store or University Text Book and Supply the week before classes begin.

Course Description:

Biology 121 is an introductory laboratory that emphasizes the experimental aspects of cellular organization and processes, metabolism, DNA structure and replication, and Mendelian genetics. Since lab investigations illustrate, complement, and supplement material presented in Biology 120 lecture, this lab course should be taken concurrently with the lecture. Emphasis in this lab course is on learning-by-doing.

Natural Science Explorations Category of Colonnade

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Activities by Which You Will Learn Objectives

- Attending and actively participating in the laboratory each week.
- Completing all pre-lab exercises and reading/reviewing laboratory instructions detailed in your laboratory manual.
- Completing all laboratory experiments and assignments.

Preparation for lab:

You must read the lab manual before coming to class each week. Reading the lab beforehand will allow you to spend your time in lab focusing on the results of the experiments instead of trying to figure out how to do the experiments. Reading the manual before lab will also be necessary for the weekly quiz (see below). In addition, there are “Prelab” exercises at <http://bioweb.wku.edu/courses/biol121/prelabs.htm>. Your lab instructor will demonstrate how to access and complete the PreLab assignments during the first lab period of the semester.

GRADING

Lab Participation (20pts):

Laboratory attendance is mandatory and you must arrive on time and participate in the lab exercises. Quizzes are given at the beginning of the lab, and you will not be allowed to take the quiz if you arrive after the quiz has been completed. In addition, if you leave the classroom before the laboratory has been completed, you will lose the participation points for that lab period. If you attend all lab sessions and participate in all lab exercises, you will be awarded 20 points. One un-excused absence will result in a deduction of 10 points, a second un-excused absence will leave you with 0 participation points. If you miss your regularly scheduled lab with an excused absence, you may arrange with your instructor to attend one of the other lab sections. The lab materials are only available for one week so the lab must be made up during the same week in which you could not attend your regular class meeting.

Please note: due to the hands-on nature of this laboratory course there will be a maximum of two excused absences - Any student missing more than two labs (for any reason) will be counted absent, will lose participation points as stated above, and will not be allowed to make up quizzes or missed assignments.

Assignments (50 pts): There will be assignments given throughout the semester by your TA – the total value of the laboratory assignments will be 50. The value of each individual assignment will be determined by your lab instructor. Assignments that are turned in after the stated due date will be assigned a grade of zero.

Weekly Quizzes (10 x 10 = 100 pts): There will be a 10-point quiz given in the first 10 minutes of each lab (with the exception of the first lab, the day of the midterm, and the day of the final).

Exams (100 pts X 2): There will be two exams covering the laboratory material from the first and second halves of the semester. Each exam will be worth a total of 100 points. The exams will consist of a 20pt practical plus an 80 pt written portion. Make-up examinations will be given at the discretion of the instructor, usually only in the case of serious illness or death in the family.

Total Possible Pts: 370

*Grades are earned by the student, not given by the instructor. Your instructor will assign the grade that you have earned in the course.

*There will be no “extra credit” provided for this course – therefore, do not ask for it.

A = 90-100% B = 80-89.9% C = 70-79.9% D = 60-69.9% F = < 60%

LABORATORY SCHEDULE 2013

Introduction to Lab

Metric system, Measurements, Graphing, Data Analysis

Biological Molecules - I. Chemical Analysis of Food

Biological Molecules - II. Proteins and Nucleic Acids

Biological Membranes - Diffusion/Osmosis

Properties of Enzymes - Biological Catalysts

MIDTERM EXAM (100 pts)

Cellular Respiration

Photosynthesis

Cell Cycle, Mitosis, Cancer

Mendelian Genetics

Polymerase Chain Reaction / Agarose Gel Electrophoresis

PCR continued / Review for Final

FINAL EXAM (100 pts)

POLICIES

ACADEMIC INTEGRITY: It is expected that each student will do his/her own work at all times. Therefore, cheating/academic dishonesty in any form (plagiarism, altering exams, copying, etc.) will not be tolerated– violators will be reported to Judicial Affairs and the **minimum** penalty will be a grade of zero for the exam or assignment. The WKU student conduct code can be seen at: http://wku.edu/judicialaffairs/?page_id=70

ADDITIONAL LABORATORY RULES: **Goggles** are required for all labs involving liquids that could splash in your eyes. Please have goggles by the second week of lab. No gum, food, drinks, or tobacco products are allowed in the laboratory at any time. Cell phones, laptops, IPODS, and other electronic devices must be turned off and stowed away for the ENTIRE duration of the lab.

CLASSROOM CIVILITY: Students are expected to assist in maintaining a classroom environment that is conducive to learning and respectful of the instructor and fellow students. The time spent in the classroom is to be a time of intellectual gain, thus students are prohibited from using cellular phones, laptop computers (if they are not being used to type notes), and beepers, making offensive remarks, reading newspapers, or engaging in any form of distraction. Inappropriate behavior shall result in, minimally, a request to leave class.

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA): Due to the FERPA Act, if you are 18 years old or older, the instructor cannot discuss your grades, etc. with your parents.

STUDENT DISABILITIES SERVICES: In compliance with university policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Office for Student Disability Services in Downing University Center, A-200. The phone number is 270 745 5004. Please DO NOT request accommodations directly from the professor or instructor without a letter of accommodation from the Office for Student Disability Services.

THE LEARNING CENTER: The Learning Center (DUC A330) provides free supplemental education programs for all currently enrolled WKU students. TLC offers CRLA Certified, one-on-one tutoring in over 100 general education subjects by appointment or walk in and a hosts a branch of the English Department's Writing Center. TLC is also a quiet study area, with side rooms designated for peer to peer tutoring, and offers a thirty two machine computer lab. Additionally, TLC has satellite locations that provide computer and print service, tutoring, and quiet study areas. For more information, or to schedule a tutoring appointment, please call TLC at (270) 745 - 6254 or log on to the website at (<http://www.wku.edu/tlc>)

WITHDRAWALS AND AUDITS: If you wish to audit or withdraw from the course, you should do so by the dates mandated by WKU. Be sure you are aware of these dates because credit for the course will not be changed to an audit after the university designated time. You also cannot drop the class or change to Audit or Withdraw after the designated time. Be aware that IT IS YOUR RESPONSIBILITY TO DROP THE CLASS. Do not assume that the instructor will do this for you. University policy states, "Students who, without previous arrangement with the instructor or department, fail to attend the first two class meetings of a course meeting multiple times per week or the first meeting of a class that meets one time per week MAY be dropped from the course; however, students are responsible for officially dropping any course for which they have enrolled." **Ceasing to attend class does not activate the drop, withdrawal, or incomplete grade processes. You must submit the appropriate forms for each by the published deadlines to end your enrollment in this class. Failure to complete the appropriate forms may result in a failing grade for this course.**