

## UNDERGRADUATE CURRICULUM PROPOSAL COVER SHEET

**Title of Proposal – Must begin with Department Abbreviation:**

BIOL428 - Cell Biology Suggested Prerequisites Revision and Catalog Description Change

Check One:  Full Proposal or  Information Item

**Effective Date for Curricular Offering:** Offered twice a year. New change should start as soon as possible.

**FROM:** Jose Maria Ferreira Barbosa, Biological & Environmental Sciences, Dept#2653, x-4299, jose-barbosa@utc.edu  
(proposal originator: include spokesperson's name, department, office number, telephone, e-mail)

**Does this require new resources from the originating department or other department?** No  
Please attach explanation if yes.

**Faculty of the originating department approved this proposal on** Nov. 7, 2008 (date),  
by a vote of 16 aye votes; 0 nay votes; 0 abstentions; 1 eligible voting members absent

**The following have examined this proposal:**

**Dept Head/Director:** John Tucker *John Tucker*      
(printed name) signature approve neutral disapprove\*

**College Curriculum Committee** Date: \_\_\_\_\_ Vote: \_\_\_\_\_ Signature of Chair: \_\_\_\_\_

**Spokespersons for Affected Departments:**

\_\_\_\_\_  
(name, department, date) signature approve neutral disapprove\*

\_\_\_\_\_  
(name, department, date) signature approve neutral disapprove\*

\_\_\_\_\_  
(name, department, date) signature approve neutral disapprove\*

\_\_\_\_\_  
(name, department, date) signature approve neutral disapprove\*

**Dean/Director:** H. Burkenn *H. Burkenn*      
signature approve neutral disapprove\*

**University Registrar:** Linda Orth *Linda Orth*      
(printed name) signature approve neutral disapprove\*

**Provost:** Phil Oldham *Phil Oldham*      
(printed name) signature approve neutral disapprove\*

\*Those who disapprove may attach an explanation

ACTIONS on this proposal:	Curriculum Committee	Faculty Senate
Date the proposal was considered	_____	_____
Vote of the body:	_____	_____
Accepted as information item (indicate date)	_____	_____
Approved as submitted (indicate date)	_____	_____
Approved with amendments (amendments indicated and transmitted to all signatories above, date):	_____	_____
Signature of Chair:	_____	_____

**Proposal to Curriculum Committee  
Biology 428**

**Change Catalog Description and Addition of Biol. 325 (Genetics) as a prerequisite for Biol. 428**

**1. Catalog Description  
Biology 428 – Cellular Biology (4 hours)**

***1.a Current catalog description:***

Morphological and chemical organization of the cell; cellular metabolism; metabolic energy relationships; natures of enzymes; fermentative and oxidative metabolism; photosynthesis. Fall and /or Spring semester. *Lecture 3 hours, Laboratory 2 hours. Prerequisites: Biology 122 with a minimum grade of C, Chemistry 352/354. Mathematics 131 or equivalent. Laboratory/studio course fee will be assessed.*

***1.b Proposed catalog description:***

An exploration of life's basic unit: morphological and chemical organization of cells, cell biochemistry, life cycles, cellular reproduction and cell regulation, bioenergetics, cellular respiration, photosynthesis, cell molecular genetics, cell signaling and communication, cancer; immune response. *Lecture 3 hours, Laboratory 2 hours. Prerequisites: Biology 325, Chemistry 352/354. Laboratory/studio course fee will be assessed.*

**2. Recommendation**

Require Biol 325 (Genetics) as a prerequisite for Biol 428 (Cell Biology). The catalog would read as in item *1.b* above:

*Prerequisites: Biology 325, Chemistry 352/354.*

**3. Rationale**

Modern cell biology is a discipline that integrates three different fields: cytology, genetics and biochemistry. Cytology and genetics are the central core of cell biology. A basic knowledge of genetics is necessary to understand among others, topics of expression and transmission of genetic information that are taught in cell biology. When students in the class have not had Biol 325, the instructor is obliged to cover basic subjects of genetics. As a consequence, because of time limitations, other subjects more specific to cell biology can not be covered in as much detail as desirable. Biology 325 is a core requirement of all biology students. To meet the demand, the course is offered every semester, thereby allowing students reasonable opportunity to enroll in Biol 325 before taking Biol 428. Math 131 and Biology 122 are not listed as prerequisites because they are prerequisites for Biology 325 which is now being requested to be included as a prerequisite for Biology 428.

**4. Effect of Course on the Departmental Program**

This requirement, if accepted, should have no effect other than to strengthen the background of students seeking to enroll in Biol 428 in order to fulfill their degree requirements or acquire a background in this topic to pursue other ventures. However, following the approval of this proposal we may experience a drop in the enrollment in Biol 428 in the first semester. Students that may have planned to take the course before Biol 325 may have to reschedule.

**5. Relation of Course to Other Departments**

Cell Biology is a course frequented by biology and many chemistry students. Creating conditions to strengthen this course will benefit students in both departments. Since biochemistry is one of the three parts of cell biology, aspects covered in this section will be a good introduction for students that have not studied biochemistry, or it can be a helpful review for those who had the course.

**Cell BIOLOGY: BIOL 428**  
**Semester / Year**

**INSTRUCTOR:** Dr. Jose Barbosa, Department of Biological & Environmental Sciences

**OFFICE:** 114 Holt Hall. Office hours: x.xx - x:xx AM / PM (Days of the week)  
(425-4299) Jose-Barbosa@utc.edu)

**LECTURES:** Lectures are from xx.xx to xx.xx AM (Days) Room xxx Holt Hall.  
Attendance is **mandatory**, non attendance may affect student evaluation.

**REQUIRED TEXTS:** Cell and Molecular Biology (5<sup>th</sup> edition, Gerard Karp).

**COURSE DESCRIPTION:**

*Prerequisites: Biology 122 with a minimum grade of C, Chemistry 352/354, Mathematics 131 or equivalent. \*\*\**

An exploration of life's basic unit. Students will focus on the understanding of cells from both structural and functional aspects. The fundamentals of cell biochemistry, life cycles, and regulation will be studied. Current issues published in leading research journals will be discussed. Morphological and chemical organization of the cell; bioenergetics; cellular respiration; photosynthesis; molecular genetics; cellular reproduction; cell signaling and communication; cancer; and the immune response. Lecture 3 hours, laboratory 2 hours. 4 credit hours

**COURSE OBJECTIVES:**

To investigate the organelles that compose eukaryotic animal cells and understand how these organelles function individually and cumulatively to contribute to the overall function of the cell.

To understand molecular interactions that occur within cells and contribute to the overall function of the cell.

To investigate cell-cell communications and cell-environment communication.

**GENERAL POLICY and PROCEDURES:** You should retain this schedule of lecture topics, reading assignments, test days, and relevant instructions for reference throughout the semester. You are responsible for learning the material that will be covered in the examinations, for preparing for lectures by reading assignments beforehand, and for being present on test dates without further notice or additional reminders.

**SPECIAL ACCOMMODATIONS:** Students who need special accommodations are encouraged to see me after class or in my office so we can discuss each particular situation

**confidentially if necessary.** You can contact me, if these times conflict with your schedule. Exam accommodations should be arranged at least one week in advance.

**Special Request:** With the advance of technology, cell phones and pagers have become commonplace. As a courtesy measure, please turn off these devices for the duration of the lecture.

**GRADING:** Grades are assigned according to the points-earned system shown below. **NO** subjective grade adjustments will be made. If all students earn A's all students will receive A's. Note that the instructor realizes that this is a heterogeneous class in terms of background and /or interest. However, expectations are equal for all students enrolled in this course. Each student **MUST** earn his/her grade and it will not be a gift. You should keep track of your points in each exam. Tear off sheets indicating your raw scores and correct answers will be provided to you after each lecture exams.

Exam I	100
Exam II	100
Exam III	100
Exam IV (Final)	150
Quizzes & assignments	30
<b><i>Sub-Total (Points from lecture)</i></b>	<b>480 <math>\Leftrightarrow</math> 80%</b>
Lab Quizzes	30
Homework assignment	10
Lab Notebook	10
Lab Test Midterm	30
Lab Final exam	40
<b><i>Sub-Total (Points from the lab)</i></b>	<b>120 <math>\Leftrightarrow</math> 20%</b>
<b>TOTAL POINTS FOR THE COURSE</b>	<b>600 <math>\Leftrightarrow</math> 100%</b>

\* Be aware that the score from the lectures examination comprehend only 80% of your final grade. Laboratory grade make up for the remaining 20% of your final grade for the course. This Missing exams, quizzes, homework assignments, should be avoided at all cost. Valid reasons for absences are: 1) **severe** illness, 2) documented personal or family emergencies, 3) official University excuses. Illness will necessitate a note from the doctor or infirmary (as will a family emergency). Official University excuses will likewise require documentation. Preferably, advise me beforehand as to absences on a test day. **Additionally, if you wish to make up a missed exam the instructor must be contacted before the next class period following the exam, and your written excuse presented and a makeup scheduled, or else no make up exam can be granted.** If that is not possible to contact the instructor by the next class meeting, but you have a valid excuse for your absence and an excuse for why contact with the instructor was not made, you may be allowed to make-up exam only under unusual extenuating circumstances, but contact with the instructor at the earliest possible time is **MANDATORY**.

**CHEATING: VIOLATION OF THE UNIVERSITY ACADEMIC HONESTY CODE WILL BE DEALT WITH AS OUTLINED IN THE RULES AND REGULATIONS TO DEAL WITH ACADEMIC DISHONESTY MATTER.** All forms of academic dishonesty will be reported to the appropriate organization. This may result in failing grade, suspension, and/or expulsion from the University. These are serious problems, and since you are all advanced undergraduate and graduate students, any discovered attempt at academic dishonesty will be treated as extremely grave. (Note this includes turning in an excuse for absence that cannot be verified as true.)

Lecture topic sequence (and required reading from the text)

<u>Week</u>	<u>Topic</u>	<u>Chapter</u>	<u>&amp; Pages in text</u>
1.	Intro to the cell and	1,	1-31,
2.	Biochemistry and	2	32-85
3.	Bioenergetics	3	86-120
4.	The Plasma Membrane Function and Structure	4	121-181
<b>Exam I</b>			
5.	Physiology of the Mitochondrion: Aerobic Respiration	5	182-216
6.	Physiology of the Chloroplast: Photosynthesis,	6	217-242
7.	Cell Interactions w/ Their Environment	7	243-278
<b>Exam II</b>			
8.	Cytoplasmic Membrane Systems	8	279-333
9.	The Cytoskeleton	9	334-395
10.	The Gene and the Genome	10	396-435
11.	Control of Genetic Expression and the Nucleus	11-12	436-549
12.	DNA Replication and Repair	13	550-577
<b>Exam III</b>			
13.	Cellular Reproduction and Cell Signaling, Lab Final	14-15	578-668
14.	Cancer, The Immune Response	16-17	669-732
15.	15 techniques in cellular and molecular biology	18	733-780
<b>Final Exam</b>			

## **Lab rules and regulations**

- Be on time for lab. We will give instructions, clarifications and changes in protocol at this time. If there are exercises or lab reports due they must be handed in at the beginning of lab.
- You may NOT eat, drink, or smoke in the laboratory at any time.
- Clean up after yourself. There will be waste receptacles for trash and tubs for glassware - please remove labels/tape from tubes and beakers before leaving them to be washed.
- Prepare for lab by following the format given in the **lab notebook handout (will be posted on the blackboard)**. Note any questions you have about the methods or experimental system, and do the calculations required before coming to lab. For some labs, you will be required to turn in a flow chart diagramming out the procedure – make two copies, one to turn in and another to use in lab. Bring your notebook (handouts) to lab each week to record data and observations. Write in ink! In research laboratories, one's notebook stays in the laboratory, and is frequently used as a resource by others. Your notes and data should be clear enough that someone could reproduce your experiment or analyze your results. However, for the purpose of these labs they will be important for your lab exam. Your notebook (lab notes) may be assessed a few times during the semester.
- Material from the laboratory exercises may be used in lab quizzes and final exam.

## **Lab # Topic/Assignment**

Introduction to Cell Biology Laboratory

Lab 1: Microscopy

Lab 2: Observation of cell structure using specific staining techniques

Lab 3: Enzymology (Protein extraction and enzyme assays)

Lab 4: Membrane permeability

Lab 5: Interactions between Cells and their environment.

Lab 6: Mathematical analyses of results obtained from previous laboratory experiments.  
and

### **Mid-term Exam**

Lab 7: Nucleic Acids (Extraction, quantification, spectrophotometry. Restriction of DNA molecules using different restriction endonucleases)

Lab 8: (Electrophoresis I (DNA agarose gel electrophoresis)  
protein quantification. The BIO-RAD assay

Lab 9: Electrophoresis II (Protein electrophoresis (SDS-PAGE)

Lab 10: Final draft of Report

Lab 11: Motility: Cell Models

## **Final Exam**

## **BIOL 428 - Lab session Grading Policy**

**Lab Notebook:** Each student should have a spiral bound notebook for taking lab notes. Notebooks must be brought to the lab each session. Lab notebooks will be graded at mid semester and after the laboratory final exam which is taken at the last class of the semester.

**Pre-lab reviews:** For most labs there will be a pre-lab review or quiz which could be posted on Blackboard. This should be completed before a given lab.

**work:** Lab homework for a particular lab will be due the following lab date at the beginning of the following lab. Late submission of homework assignments will result in a deduction of 2 points (10%) for every day past due date.

**Report:** You will write a simple, descriptive lab report. For every day a particular draft is late, 2 points will be deducted from the final report grade.

**Final Exam:** Comprehensive written exam given the last lab day.

### **Summary of Grading Policy:**

#### **Assignment Points**

Lab Quizzes	30
Lab Notebook	10
Homework assignment	10
Lab Test Midterm	30
Lab Final exam	40
<b><i>Sub-Total (Points from the lab)</i></b>	<b>120 <math>\Leftrightarrow</math> 20%</b>

### **Grading scale: Grade Points Percent Grade\***

\*You should remember that there is not a separate grade assigned for the lab. Points accumulated from the lab exams and assignments count for 20% of your final grade in the course. If you are successful in the lab, it may be helpful to improve your final overall score for the course.



## LABORATORY SAFETY GUIDELINES

**Students must follow safety rules. Careless technique, reckless behavior or refusal to adhere to safety rules will result in the offending student being asked to leave the lab with 10 point deduction from grade for that lab, and no makeup lab permitted.**

***INFORM INSTRUCTOR OF ANY LABORATORY ACCIDENT IMMEDIATELY!***

***Please print out two copies, sign one and turn in to your Instructor by the end of the second week. See below.***

1. All students must wear a laboratory coat or apron if required. Gloves and other protective items maybe required for many procedures. If you wear shorts, your lab coat must be long enough to protect exposed upper legs. Open-toe shoes (sandals) are not permitted in lab.
2. Wipe work area thoroughly before and after each lab period. Do not store personal items on lab bench. The lab bench should be clean for the next person who comes afterward to work in the same space.
3. Wash hands before beginning lab and at end of lab. Do not eat, drink, or apply cosmetics in lab.
4. Know where eyewash station, fire extinguisher and first aid supplies are located.
5. Hazardous chemicals, when used, are identified in your lab manual. Wear gloves and use special care when handling acids and toxic or caustic chemicals. Wipe up chemical spills immediately. If chemicals contact skin, flush area with water (or appropriate solvent) immediately.
6. Use caution around open flames. **Use only Pyrex® or Kimax®-labeled tubes for heating over flame.** Wear safety glasses when using burner, tissue homogenizer, and any other time there is a possibility of creating aerosols or flying glass particles.
7. Use gloves/tongs to handle hot beakers or containers. Transport hot liquids in/on a secondary container using a cart.
8. Never mouth pipette; use a pipette aid. Transport reagents in a tube, beaker or other appropriate container, not in a pipette. Reagents that are heat sensitive should be kept on ice at all time and handle properly.
9. Place all broken glass and **ALL USED MICROSCOPE SLIDES AND COVERGLASSES** into the glass disposal box--**DO NOT** put them into the dishpan or the trash.
10. Discard all used **disposable** materials into appropriate designated containers. Sharp objects (razors, needles, etc.) must be placed into sharps disposal container. Used chemicals and hazardous waste must be transferred to appropriate waste containers.
11. Wash all glassware and other equipment used by your group before leaving lab. Clean all equipment and return equipment and supplies to proper storage.
12. If you don't know the proper safety procedure, ask!

I have read, understand, and agree to abide by the above safety rules.

Name \_\_\_\_\_

Date \_\_\_\_\_