MONTGOMERY COUNTY COMMUNITY COLLEGE
BASIC TECHNIQUES AND INSTRUMENTATION FOR BIOTECHNOLOGY
BIT 123 (3-2-3)
Course Outline

Spring 2006
Tu/Th 9:35 a.m. - Noon
Room SC-313
Web page: http://faculty.mc3.edu/lrehfuss/lrehfuss.htm
Office hours: Tu/Th 8:30-9 a.m. & 12-12:30 p.m., Wed 8:15-8:45 a.m. & 12-12:30 p.m. & by appointment

Dr. Linda Rehfuss
Phone/campus location: 215-641-6643, SC-344
E-mail: lrehfuss@mc3.edu

Required Textbook: Basic Laboratory Methods for Biotechnology: Textbook and Laboratory Reference. Authors: LA Seidman and CJ Moore

A laboratory manual will be provided to you. Handouts may be given out during the semester. See web page for copies of Power Point presentations, found in Power Point and PDF formats.

You will need a 3-ring binder, bound lab notebook and a calculator for lab. Lab coats need to be purchased. Safety glasses and gloves will be provided to you. You must wear a lab coat, gloves and safety glasses at all times during an experiment.

COURSE DESCRIPTION
This course will allow students to gain theoretical and practical, hands on knowledge of both commonly used and some specialized laboratory instruments, as well as preparation of common solutions, reagents and methodology. The students will also be oriented to techniques that include maintenance (and corresponding record keeping), repair and calibration of laboratory equipment. Discussion and implementation of laboratory safety policies will be key components to the entire course.

PREREQUISITES
BIT 120 (with a grade of C or better); CHE 131 or CHE 151

LEARNING GOALS
Upon completion of this course, students will be able to perform the following:

1. Understand laboratory safety practices when using biological and chemical materials.
2. Implement laboratory safety practices in day to day class activities.
3. Maintain accurate laboratory notebooks and instrument logs.
5. Develop a written SOP for a laboratory process or instrument.
6. Operate standard equipment found in a biotechnology laboratory.
7. Calibrate standard equipment found in a biotechnology laboratory.
8. Perform routine maintenance of equipment found in a biotechnology laboratory.
9. Prepare and standardize various strengths of molar, normal and percent solutions.
10. Define and perform common laboratory measurements.
11. Describe aseptic techniques as they pertain to microbiological procedures.
12. Demonstrate aseptic techniques in preparation of bacterial cultures.
13. Define biological separation methods of filtration and centrifugation.
14. Define and distinguish the roles of Quality Control (QC) and Quality Assurance (QA) in a biotechnology setting.
15. Design an experiment to demonstrate the quality control issues in a laboratory setting.
16. Plan and deliver an oral presentation and paper about relevant biotechnology topics.

COURSE POLICIES

ATTENDANCE: Class attendance is mandatory for successful completion of this course. Laboratory courses are not like lecture-only courses; if you were not there, you do not know how to perform the task!

ASSIGNMENTS: Reading assignments should be completed prior to the lecture given for that specific topic. The presentation will be about a topic of your choice related to biotechnology, but please inform the instructor of your topic as soon as possible, so there is no duplication of topics. The paper should describe an important biotechnology technique. There are many scientific journals and magazines in the biotechnology lab (SC-313) that you may sign out for your use. Laboratory write-ups will be due on the dates outlined in the course schedule below. The laboratory and lecture portions of this course will be integrated.

CHEATING AND PLAGIARISM: These two (2) activities will not be tolerated at any level. Please refer to the Student Code of Ethics on cheating and plagiarism in the student handbook.

WITHDRAWL FROM COURSE: Please refer to the MCCC Catalog for procedures, deadlines, etc.. The instructor will sign a drop slip until 04/21/06.

STUDENTS WITH DISABILITIES: Students with disabilities may be eligible for accommodations in this course. Please contact the Director of Services for Students with Disabilities in the Disability Services Center, College Hall 131, (215) 641-6575 or 6574, for more information. At the West Campus, contact the Coordinator of Disability Services in the Student Development Center at (610) 718-1853.

INCLEMENT WEATHER: Please listen to KYW for closing information. The code is 320 for day classes and 2320 for evening classes. You may also check KYW’s Website at www.kyw1060.com for closing information. You can also call the Central Campus’ main number (215-641-6300) and follow the prompts for receiving school closing information.

MISCELLANEOUS: Please seek help early if you are having difficulty with the material. As a courtesy to all students, please turn off cell phones and beepers during class.

GRADING: Grades for this course will be based on a point system. There will be a total of 600 points* for the course, to be distributed as follows:

- Exams (3) – 300 points (100 points each)
- Labs (12) – 100 points (8 points each labs 1-11, 12 points for lab #12, which includes 4 extra points of the Table of Contents)
- Quizzes (2), Presentation (1) and Paper (1) – 100 points (25 points each); Note: you will be given 3 quizzes, but you will be able to drop your lowest quiz grade, counting only your 2 highest quiz grades.
- Cumulative Final Exam (1) – 100 points
* Attendance sheets will be initialed daily – **3 points** will be deducted from your total points if a lab report is handed in late and/or if you are more than 10 minutes late for class.

**MAKE-UPS:** None for the 3 exams, paper or presentation. Please note (as stated under the GRADING section) that you will be able to drop your lowest quiz grade.

**COURSE SCHEDULE (follows):** While every effort will be made to remain on schedule, **this schedule and syllabus are subject to change.** Students will be notified of any changes that are made.

### COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture Topic(s) and (Lab)</th>
<th>Reading</th>
</tr>
</thead>
</table>
| 1/19  | **Intro. to course; course policies and syllabus**  
Lab familiarization; lab safety contract; begin safety (HHMI video)  
(no formal laboratory- chose lab partners)                                                                                                                                                                                                                                                                                                                                                              | SM Chap 1-2                  |
| 1/24  | **Review biotech workplace**  
Institutional lab safety;  
Begin documentation and recording (lab exercise 1-keeping a lab notebook (weighing objects)                                                                                                                                                                                                                                                                                                                                                     | SM Chap 1-2                  |
| 1/26  | **Continue documentation and recording**  
biotech regulatory issues  
Quality Systems in the Laboratory                                                                                                                                                                                                                                                                                                                                                                        | SM Chap. 3-7                |
| 1/31  | **Quiz # 1**  
(lab exercise 2- writing an SOP/model)                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |
| 2/2   | **Math in the biotech lab**  
(exercise - perform various calculations)                                                                                                                                                                                                                                                                                                                                                                                                                                   | SM Chap. 8-10               |
| 2/7   | **Measurement of weights**  
(lab exercise 3- measurement of weights)  
*Note: this chapter out of sequence*                                                                                                                                                                                                                                                                                                                                                                     | SM Chap 15                  |
| 2/9   | **Field Trip to the Immune Response Corp., King of Prussia, PA**                                                                                                                                                                                                                                                                                                                                                                                                               |                             |
| 2/14  | **Relationships and graphing; radioactive decay**  
data description/data collection                                                                                                                                                                                                                                                                                                                                                                                   | SM Chap 11-12               |
| 2/16  | **Exam # 1**                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |
| 2/21  | **Lab measurements, test, assays**  
Instrumental measurements/electricity                                                                                                                                                                                                                                                                                                                                                                                 | SM Chap 13-14               |
| 2/23  | **Measuring volumes**  
(lab exercise 4- measuring volumes)                                                                                                                                                                                                                                                                                                                                                                                                                                   | SM Chap 16                  |
2/28 Measuring temperature and pH  SM Chap 17-18
(lab exercise 5 – measuring pH)

3/2 Quiz # 2
Measurement of light  SM Chap 19-20

3/7 Preparation of solutions  SM Chap 21
(lab exercise 6 – solutions for conductivity)

lab notebooks due: labs 1-4

3/9 continue with lab #6 conductivity – lecture if time permits

3/14 & 3/16 NO CLASSES – SPRING BREAK

3/21 Lab solutions for biological materials  SM Chap 22
(lab exercise 7- tris-buffered solutions)

3/23 Exam # 2
Biological solutions, cont’d  SM Chap 23

3/28 Continue with lab 7 - tris buffered solutions – lecture if time permits

3/30 Student presentations

4/4 Separation methods – filtration  SM Chap 24-25
(lab exercise 8 [#10 in manual] standard curves with food coloring)

4/6 Quiz # 3
Separation methods – centrifugation  SM Chap 26

4/11 Separation methods – bioseparations  SM Chap 27
(lab exercise 9 [#11 in manual] protein assay)

4/13 Lab exercise 10 (#13 in manual) UV spectra of DNA

lab notebooks due: labs 5-8

4/18 Introduction to aseptic techniques in the lab  handouts
(lab exercise 11- follow handout on aseptic techniques)
(lab exercise 12 – follow handout on gel electrophoresis)

4/20 Continue with labs 11 & 12 – lecture if time permits

4/25 Exam # 3 (lecture if time permits)

4/27 General lab safety/working with chemicals  SM Chap 28-30
Safety in the lab with biomolecules

lab notebooks due: labs 9-12

5/2 Wrap up any unfinished lectures and labs/ review for final
Final exam: Time and Date to be announced