BIO 147-Section 060M
Basic Laboratory Calculations for Biotechnology
Fall 2014

Meeting Time: T 10:00-11:00 am
Class Location: MP-0211
Instructor: Vashti C. Bryant, Ph.D.
Faculty Office: Parrish Hall Building, Room 213
E-mail: vbryant@nvcc.edu
Telephone: 703-530-3059
Website: http://blogs.nvcc.edu/vbryant/
Office hours: W 5:00-7:00 pm, R 1:00-3:00 pm
by appointment: T 3:00-4:00 pm and 5:00-6:00 pm; R 3:00-6:00 pm

Recommended Materials
- Seidman SA. Basic Laboratory Calculations for Biotechnology, San Francisco: Pearson Benjamin Cummings, 2008.*
- A scientific calculator is also highly recommended for this course.

*Please note, this course does not require the purchase of a textbook.

Minimum Technical Requirements
This course is taught in a hybrid format which requires a portion of the course to be delivered online in lieu of traditional classroom hours. Students must have reliable Internet access and access to Blackboard to complete the online portion of the course. Students will also need MS Office. We will use Excel and Word in this class.

Course Description and Goals

Course description:
Prepares students to work effectively in a scientific laboratory through instruction of the metric system, scientific notation, exponents, solution making, pH readings, and the creation of standard curves for data analysis. Focus will be on quantitative skills needed to perform most basic laboratory work. Skills will be practiced and reinforced through application-based problems and hands-on activities. Lecture 1 hour per week.
Course purpose:
Because entry-level technicians need to have strong quantitative skills, this course is designed to be taken previous to or to accompany BIO 250 Research Methods and Skills to allow adequate time for instruction in this area. Such skills include the use of units, calculations, measurements, and conversions. Ideally, this course will be taken concurrently with BIO 250 – Biotechnology Research Methods and Skills so that students can maximize their laboratory experiences while still learning all of the required basic laboratory calculations. This course is designed for students in the A.A.S. in Biotechnology and the Biotechnology Lab Technician Career Studies Certificate programs.

Entry level competencies:
Prerequisites: Program placed. Co-enrolled in BIO 250, or biotechnology program head permission.

Course objectives:
Upon completing the course, the student will be able to:

• Use the metric system appropriately while conducting experiments
• Convert numbers to scientific notation in lab calculations
• Perform calculations with exponents when making dilutions of samples
• Perform solution making calculations accurately and carry them out in the laboratory
• Understand the concept of pH and relate it to concentration and exponents
• Create and analyze a standard curve with lab samples
• Represent data graphically
• Perform basic statistical analyses on laboratory data
• Use and interpret data derived from spectrophotometry
• Calculate amounts of nucleic acids and proteins

Course Policies

Attendance:
This course is a hybrid course whereas 50% of the coursework will be completed outside of the classroom. Students are expected to spend at least one (1) hour a week to complete coursework expectations. The online portion of the course will be self-paced, but must be completed by the deadlines listed.

The face to face portion of the class will begin promptly. Please show respect by arriving on time. Students are expected to attend all scheduled class meetings in a timely AND professional manner. It is the student’s responsibility to acquire all class materials distributed during an unavoidable absence. Attendance not only means being physically present, but also conducting one’s self in a manner appropriate for college level learning. Inappropriate and/or disruptive behavior may result in suspension from class and/or academic dismissal. Questions and discussion are encouraged, but please be respectful of your instructor and classmates.

Due to the short duration of this course, attendance is critical for student success.

Keep this syllabus for reference throughout the semester.
Therefore, **missing more than ONE CLASS (including online hybrid activities) will result in an automatic grade of “F” for the course---NO EXCEPTIONS.**

**Communication:**

Course information: All class announcements and updates to the syllabus will be communicated through NOVA’s email and Blackboard systems. You are strongly advised to check these systems regularly.

Contacting the instructor: The best method to contact Dr. Bryant is via email. All emails should be written in professional business format and include your name in the closing. Personal email addresses should NOT be used to communicate course information. Email messages may be replied to within 24-48 hours. Please do not expect answers to emails on the weekends or after 6pm during the week. Another way to contact the instructor is to leave a voicemail but responses may be delayed due to Dr. Bryant’s out of office schedule. You are also welcome to stop by during Dr. Bryant’s office hours, but without an appointment there is a possibility she will be busy with other meetings or tasks. If the posted hours are not amenable to your schedule, please contact Dr. Bryant and another time can be set up to accommodate your needs.

Cell phones:

Cell phones and other electronic devices should be turned off before entering the classroom. No calls or texts should be answered during lecture. Failure to adhere to this policy will affect your attendance grade. Laptops will be allowed for note-taking ONLY (no Facebook, Twitter, chat, etc.). If an electronic device is heard during class, you may be asked to leave the room.

Academic dishonesty:

Academic dishonesty cannot be condoned. When such misconduct is established as having occurred, it subjects you to possible disciplinary actions ranging from admonition to dismissal, along with any grade penalty the instructor might, in appropriate cases, impose. Procedural safeguards of due process and appeal are available to you in disciplinary matters.

No form of academic dishonesty will be tolerated. This includes but is not limited to sharing information during homework assignments and exams, plagiarizing (including from the web), and not fully participating in any group activities or assignments. If you are suspected of cheating on an exam, you will immediately be asked to leave the room. On the first offense of cheating, you will receive a zero on the assignment/exam. On the second offense, you will fail the course. There are no exceptions to these rules. You will also be reported to the Dean of Student Services who may enforce further consequences. Please refer to the Student Handbook for further information.

Course withdrawal:

The last day to withdraw with a tuition refund is August 28th. The last day to withdraw without a grade penalty is September 21st. Please contact Dr. Bryant as soon as you begin considering this as an option. If you do not attend consistently you may be forcibly withdrawn or receive a grade of “F”; however you are ultimately responsible for
withdrawing yourself from the course.

Special needs and other accommodations:
NOVA is committed to the goal of providing each qualified student an equal opportunity to pursue a college education regardless of disability. Efforts will be made toward meeting reasonable requests for services to students with disabilities eligible under Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA).

If you have any type of disability, health condition, or personal circumstance that may hinder your success in this course, please notify the instructor at the beginning of the semester. All information is confidential and will remain a private matter between you and the instructor. You should contact the Counseling and Specialized Services Unit which will help arrange special accommodations for you. Accommodations cannot be made without proper documentation.

Inclement weather:
On days where classes are cancelled due to inclement weather or other emergencies, please be sure to check Blackboard for any additional information or alternative assignments posted by the instructor.

Assessment

A combination of in-class/online activities, homework assignments, online quizzes, and a final exam will be used to assess student achievement throughout the course. Student assignments will be evaluated and grades will be posted in Blackboard within one week of the assignment due date.

Online activities:
All hybrid activity materials can be found in the Online Work section in the appropriate Week folder under the Assignments tab in Blackboard. These activities should be done on your own and the completed assignments should be submitted via Blackboard by 11:59 pm on the indicated due date. Late work will not be accepted or graded.

In-class participation:
Students will be expected to participate in various in-class activities that may involve completing practice problem sets either individually or as part of a group. If you are absent during an in-class activity, you will not be allowed to make it up.

Homework assignments:
All homework assignments must be submitted in class on the due date assigned for full credit. Assignments turned in within 24 hours of the due date will receive half credit. No assignments will be accepted after that time.

Quizzes:
Three TIMED quizzes will be administered throughout this course. These quizzes should be taken online via Blackboard and completed by the assigned due date. You may use your
calculator, notes, textbook, etc. You may attempt each quiz two times. Your highest graded attempt for each quiz will be considered your earned grade for that quiz. Your lowest quiz grade will be excluded when calculating your final course grade (i.e.-only two quizzes will count towards your final grade). No late quizzes will be accepted.

**Final exam:**
A cumulative final exam will be administered at the end of the course. All students are required to take the final exam.

**Grading and Calculating the Final Course Grade**

The distribution of grades will be as follows:

- In-class participation: 15%
- Online activities: 15%
- Homework: 30%
- Quizzes: 20%
- Final exam: 20%

A final course letter grade will be assigned according to the following grading scale:

- A = 90 – 100%
- B = 80 – 89%
- C = 70 – 79%
- D = 60 – 69%
- F = Below 60%

Keep this syllabus for reference throughout the semester.
<table>
<thead>
<tr>
<th>Week</th>
<th>In-Class Lecture Topics</th>
<th>Online Work</th>
<th>Homework</th>
</tr>
</thead>
</table>
| 1-August 24th | Introductions  
Course Overview  
Units of Measurement  
Measurements and Significant Figures | Orientation Survey  
Significant Figures Activity  
Uncertainty in Measurements Tutorial  
Significant Figures Worksheet  
**Due 08.30.14, submit via Blackboard** | Homework #1  
**Due 09.02.14, submit in class** |
| 2-August 31st | Exponents and Scientific Notation  
Using Equations to Describe a Relationship  
Ratios and Proportions  
Dimensional Analysis | Ratios and Proportions Video  
Dimensional Analysis Tutorial  
Scientific Notation Video  
Scientific Notation Worksheet  
**Due 09.06.14, submit via Blackboard** | Read: Dimensional Analysis  
Homework #2  
**Due 09.09.14, submit in class** |
| 3-September 7th | Density  
Dosages  
Percents  
Introduction to Concentration Problems | Concentrations of Solutions Tutorial  
Molarity Practice  
**Metric System Discussion Board**  
**Due 09.13.14, submit via Blackboard**  
**Quiz #1-DUE 09.08.14, 11:59 pm** | Read: Solutions Concentrations  
Homework #3  
**Due 09.16.14, submit in class** |
| 4-September 14th | Preparing Laboratory Solutions That Contain One Solute  
Preparing Laboratory Solutions That Contain More Than One Solute | Solution Preparation Video  
Making Stock Solutions Worksheet  
**Due 09.20.14, submit via Blackboard** | Homework #4  
**Due 09.23.14, submit in class** |
| 5-September 21st | Dilutions  
Serial Dilutions | Understanding Dilutions  
Dilutions Worksheet  
**Due 09.27.14, submit via Blackboard**  
**Quiz #2-DUE 09.22.14, 11:59 pm** | Homework #5  
**Due 09.30.14, submit in class** |
| 6-September 28th | Graphing Linear Equations  
Generating Standard Curves  
Graphing Exponential Equations | Understanding Graphs  
Representing Data in Graphical Form  
**Due 10.04.14, submit via Blackboard**  
**Quiz #3-DUE 09.29.14, 11:59 pm** | Homework #6  
**Due 10.07.14, submit in class** |
| 7-October 5th | **Final Exam** | Concept Essay  
**Due 10.07.14, submit via Blackboard** | |