

# BTEC 275 Course Syllabus

## Introduction to Protein Expression and Analysis

### Instructor:

### Course Section(s):

### Office (place):

### Office Hours:

**Course Description**: This course introduces the students to common techniques used for studying the expression and analysis of proteins and builds on the basic techniques for quantitation of protein concentration in solution. Studies include quantitation of single proteins, Electrophoretic techniques for estimating protein molecular weight and estimation of protein activity using basic Michaelis-Menten enzyme kinetics. This class is intended for students admitted to the Science Laboratory Technology degree program.

**Prerequisites**: Admission to the AAS-SLT Program AND BTEC 132 with a grade of ‘C’ or better OR permission of the instructor.

**Co-requisites**: None

**Course Goal**: This course introduces the essential techniques used in many biological laboratories for studying proteins. This course in conjunction with BIOL 274 – Introduction to Nucleic Acids form the basis for the Biotechnology concentration of the Science Laboratory Technology Degree.

**Texts, Readings and Other Educational Resources:**

* Required: Methods in Biotechnology, Seung-Beom Hong, M Bazlur Rashid, Lory Z. Santiago-Vazquez, Wiley Blackwell, 2017
* Required: Proteins: Biochemistry and Biotechnology, 2nd Ed., Gary Walsh, Wiley Blackwell, 2014
* Required: Laboratory coats will be purchased from the bookstore. All laboratory exercises require laboratory coats. The coats will be stored in the laboratory between classes.
* Safety Goggles: Please ask the instructor if you will need to purchase this equipment for this course.
* iClicker2: Please ask the instructor if you will need this tool for this course.

**Course Content**: Course content includes information from the textbook, learning objectives, or other materials. Lectures may be accompanied by visual aids. The topics covered are as follows:

1. Introduction to Spectrophotometery
	1. Understand how spectrophotometers work
	2. Understand Beer-Lambert law for determining analyte concentrations.
	3. Construct a standard curve for determining concentration of known and unknown compounds in solution
2. Protein quantitation of crude protein extracts
	1. Describe the various assays used for determining concentration of protein in solution.
	2. Understand the strengths and limitations of various protein quantitation assays.
	3. Construct a standard curve using known protein concentrations samples and determine an unknown protein concentration based on this standard curve.
3. Immunological approaches to determine protein concentration in solution
	1. Understand basic immunology principles of antigen/antibody relationships.
	2. Understand the various types of antibody based assays for determining protein concentration.
	3. Select the proper antibody combinations for quantitation of a specific protein in a crude protein extract.
	4. Construct a standard curve using immunologyaZbased techniques of known protein concentrations.
	5. Determine the concentration of an unknown protein in a crude protein extract from a standard curve.
4. Protein size estimation (molecular weight)
	1. Understand the basic methods for estimating protein molecular weight.
	2. Use electrophoretic techniques to separate proteins in a crude protein extract by molecular weight.
	3. Construct a standard curve of proteins based on molecular weight and estimate the molecular weight of an unknown protein.
	4. Identify a specific protein by immunological techniques from an electrophoretically separated crude protein extract.
5. Enzymatic activity
	1. Understand the basic methods for the determination of enzymatic activity.
	2. Understand factors that influence enzymatic activity.
	3. Use Michaelis-Menten enzyme kinetics for determining the Michaelis-Menten constant (km) and velocity (Vmax).
	4. Determine the Michaelis-Menten constant (km) and velocity (Vmax) experimentally for an enzyme catalyzed reaction.

**Assessment**:

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Exams and Other Assessments

* 10% of the final grade will be calculated from homework, quizzes and in class activities grades
* 25% of the final grade will be calculated from laboratory notebooks grades
	+ Refer to the instructor addendum for laboratory notebook details.
* 25% of the final grade will be calculated from skill assessments grades
	+ Skill assessments pertaining to laboratory techniques learned throughout the semester.
* 40% of the final grade will be calculated from an average of the exams.
	+ A minimum of two major exams given at regularly scheduled intervals.
	+ Additional exams may be given at the discretion of the instructor

Exam Rules:

* Makeup exams, quizzes and assignments are only permitted at the discretion of the instructor. There is no guarantee that makeups will be permitted. Review the instructor’s addendum for further requirements.
* Exams will not be dropped.
* The instructor will announce specific exam dates.
* Exams will cover material presented during the lecture, material assigned from your textbook, homework and handouts
* Exam format will be determined by your instructor. Questions can be in the form of multiple choice, multiple answer, true/false, matching, short answer, discussion, diagrams or essay.

Examination Policy:

* You are not allowed to wear hats, jackets, pull up hoods or sunglasses during exams.
* All material must be put away and electronic devices turned off and stored in a bag or given to the instructor before exams begin. Electronic devices including but not limited to phones, smart watches and recording devices cannot be on you during the exam.
* Students leaving the classroom during a quiz or exam may be barred from completing the assessment. The student should always ask permission before leaving.
* Academic dishonesty including but not limited to cheating, plagiarism or collusion may result in disciplinary action, including dismissal.
* Grades will be posted on canvas following exams.
* Instructors cannot give out grades over the phone or by e-mail.
* If you are not present on the day grades are discussed following an exam, you will need to make arrangements to stop by your instructor’s office during office hours
* Graded material is kept by the instructor. Any graded material that you may have, do not discard it until you have received your final grade for the course. If a mistake is made on your grade, if the instructor loses grades, or some other unforeseen event takes place you may need the graded material for proof of your grade. These events are very rare but it is best to keep track of your grades.
* If you feel like there has been a mistake with your grade, the first step is to discuss it with your instructor.
* Only final grades may be challenged or appealed. The challenged procedure must be completed before any appeal process is initiated. The procedure for challenging a final grade can be found in the Delgado Community College Catalog under Academic Policies.

### Grading Scale:

Grading is based on a standard 10-point scale:

| **Grading Scale** | **Letter Grade** |
| --- | --- |
| 90% -100% | A |
| 80% to Below 90% | B |
| 70% to below 80% | C |
| 60% to below 70% | D |
| below 60% | F |
| Failure due to insufficient participation | FN |

### FN grade:

* FN Grade is assigned when a student has not attended or participated significantly in the course.
* At midterm, all instructors are required to assign an FN grade to each student for whom the instructor identifies as not meeting the requirement for sufficient participation, to be successful in the course. The FN does not mean an earned failure grade; the FN means the instructor is unable to determine an earned grade.
* If a student receives FNs in all enrolled classes at midterm, the student will be unofficially withdrawn from the College by the College Registrar. Students who are unofficially withdrawn from the College due to all FNs at midterm may request reinstatement through the Reinstatement Procedures as outlined in the current College Catalog.

If a student does not receive all FNs at midterm, he or she remains enrolled in the classes (not dropped). A student with an FN in a class at midterm (not dropped) may return to the class; however, the instructor is not required to provide make-up provisions for missed coursework.

Midterm grades:

* Midterm grades reflect only a fraction of the work required to pass the course; therefore, this grade may not be a genuine predictor of your final grade.
* You can access your official midterm and final course grade through the LOLA/Banner Registration System

### Accessing Grades on the Internet

* To access your official midterm and final grade through the Internet go to [http://www.dcc.edu](http://www.dcc.edu/) and log into the LOLA/Banner registration System
* Your username and password are sent to your official DCC e-mail.
* Some instructors will use *Canvas* to post scores from quizzes, exams, and assignments. This is not the official grade for the course.

**Communication:** Emails will be returned within 24 hours during the week and the next business day on weekends and holidays. Grades will be posted in a timely manner. Depending on the type of assessment, the timeliness will range from 72 hours (multiple choice exams) to one week (short answer material, laboratory exams). All grades will be posted on canvas. Discuss with your instructor if Canvas gradebook calculates your grade.

**Disability Statement:** It is the general policy of Delgado Community College to provide an equal opportunity for academic success to all students. Reasonable accommodations for a student with a disability will be made provided the student has self-identified with the Office of Disability Services and has provided the required documentation. Instructors will appropriately modify their methods of instruction, course and examination requirements and general procedures to accommodate the special needs of the student provided the academic integrity of the course or examination is not violated and the accommodation does not jeopardize the health and welfare of all students. Accommodations will not be made without the letter of accommodation from the Office of Disability Services.  City Park Campus and Sidney Collier Site students may contact the City Park Campus Office of Disability Services at (504) 671-5161 or gpeopl@dcc.edu. The office is located in Building 2, Room 102-W.  West Bank Campus, Charity School of Nursing, and Jefferson Site students may contact the West Bank Campus Office of Disability Services at (504) 762-3191 or jwilli6@dcc.edu.  The office is located in the Student Life Center, Room 102-C.

**Academic Honesty Statement:** Delgado Community College requires that students adhere to the highest standards of academic integrity. Students are entrusted to be honest in every phase of their academic life and to present as their own work only that which is genuinely theirs. Cheating, plagiarism, violation of exam conditions, complicity in dishonest behavior, or other falsification of academic work is a serious breach of College standards.

Plagiarism is defined as any attempt to represent the work of another as one's own original work. More specifically, plagiarism is the direct appropriation of the language, thoughts, or ideas of another--either literally or in paraphrase--without appropriate notation on the source and in such fashion as to imply that the work is one's own original work.

Depending upon the nature of the case, a student guilty of academic dishonesty or violating examination policies may receive penalties ranging from a grade of "F" for the work submitted to expulsion from the College. Such penalties may be of both an academic and disciplinary nature.  Please refer to the College Catalog for additional information.

**College and Classroom Policies:** Instructors are encouraged to include policies and procedures regarding attendance, discipline, make-up exams, etc., in their individual course syllabus addendums.

**Title IX Statement:** Delgado Community College is committed to creating and maintaining an environment in which sexual violence against men and women is not tolerated. Intervening in such instances helps to foster a safe environment for all, while sending a message that his kind of behavior will not be tolerated and is unacceptable in our community. As part of its commitment to providing an educational environment free from discrimination, Delgado Community College complies with Title IX of the Education Amendments, which prohibits discrimination and harassment based upon sex in an institution’s education programs and activities. Title IX prohibits sexual harassment, including sexual violence, of students at Delgado Community College sponsored activities and programs whether occurring on-campus or off-campus. (<http://www.dcc.edu/title-ix/default.aspx>)

**Classroom Concerns:** Students having concerns about their class are encouraged to meet with their instructor first. If an understanding cannot be reached, then students should make an appointment to speak with the assistant department chair (Ms. Sara Strickland: sdeloz@dcc.edu) followed by the department chair (Dr. Amanda Rosenzweig: arosen@dcc.edu). If further actions are necessary, the student will be informed of who to speak with next. Students whose instructors miss an excessive number of classes should promptly contact the assistant department chair or department chair.