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| Course Title/Number | Introductory Biochemistry Laboratory / CHM 366 Section 201 |
| Semester/Year | Spring / 2018 |
| Days/Time | TR / 3:30pm – 6:20pm (March 1 – April 26, 2018) |
| Location | 492 Science Building |
| Instructor | John Rakus, Ph.D |
| Office | 478 Science Building (lab: 480 Science Building) |
| Phone | 304-696-6627 |
| E-Mail | rakus@marshall.edu |
| Office Hours | MTWRF / 10:00am – 11:00am |
| University Policies | By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to www.marshall.edu/academic-affairs/policies/ . Academic Dishonesty/Excused Absence Policy for Undergraduates/Computing Services Acceptable Use/Inclement Weather/Dead Week/Students with Disabilities/Academic Forgiveness/Academic Probation and Suspension/Academic Rights and Responsibilities of Students/Affirmative Action/Sexual Harassment |

Course Description: From Catalog

Introduction to basic biochemistry laboratory techniques including chromatography, electrophoresis and enzyme kinetics; methods for identification and characterization of biochemical systems. 2.0 credit hours. (PR: C or better in CHM 365)

Required Texts, Additional Reading, and Other Materials

There is no required textbook, though your CHM 365/467 textbook could be useful. Reading material will be provided on MUOnline. A bound notebook dedicated to CHM 366 is required.

Course Requirements/Due Dates

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|-----------------|-------------------|--------------------|---|-----------------|-------------------|
| March 1 | Pretest | March 6 | Proposal 1 | March 8 | Blackboard Quiz 1 |
| March 29 | Blackboard Quiz 2 | April 3 | Project 1 Presentation | April 5 | Proposal 2 |
| April 12 | Lab Report 1 | April 17 | Blackboard Quiz 3 | April 26 | Blackboard Quiz 4 |
| April 26 | Post-test | April 26/27 | Lab Report 2 (April 26) or Poster Presentation (April 27) | | |

Classroom Expectations

This is a terminal laboratory course which is designed as an inquiry-guided research class. Your classroom experience will be determined by you. Though this is only a 2-credit hour course, it is rigorous; if you only intend to put effort into CHM 366 during the time we are in lab then you will likely do poorly. My expectation is that students arrive in class fully prepared, having read any and all pre-lab literature and be ready to immediately begin class activities. The nature of research often involves downtime. As adults, you are granted the privilege of using this time as you see fit; however I expect that students will spend their time in class focused on academic activities. I will not allow streaming of music/movies/sports events/TV shows/*etc.* in class during class time nor will I allow food or drink of any kind in the lab. Behavior that is a distraction to your classmates will be strongly discouraged. Our time in class together is meant to further your academic interests and development only.

Capstone Policy

CHM 366 is designed to give students practical experience in basic biochemical laboratory techniques through original research projects. These projects are unique to CHM 366 and cannot be used to substitute for capstone or independent study credit. Students who take CHM 491 with Dr. Rakus must complete CHM 366 projects unrelated to their capstone studies. Students who have not yet selected a capstone advisor may have the opportunity to continue a CHM 366 project for their capstone.

Attendance Policy

Attendance for CHM 366 is mandatory. Each non-excused absence will result in a 5% (one-half letter grade) deduction from your overall grade. All excused absences must be documented and made up as soon as possible.

Grading Policy

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| <p>All written assignments will be graded on a +/- letter-grade basis. The letter grade will be recorded as a range. An example is: B+ (87-89), B (83-86), B- (80-82). Your conduct in class will determine what part of the range will be used to determine the final course grade.</p> | |
| <p>All assignments are due by the start of class (3:30pm) on their respective due dates. Tardiness is defined as one minute past the start of class and will result in a 10% reduction on the grade for that specific assignment. Continued tardiness on an assignment will result in an additional 10% reduction for every 24 hours past the due date.</p> | |
| Pre/Post Test (5% each) | <p>Due to our class's involvement in the Malate Dehydrogenase CURES Community (MCC) project, certain assessment data is required. This is why it is necessary for you to complete the IRB form. For CHM 366, you are graded only on completion of these assignments, not on your performance. You get full credit simply for doing them.</p> |
| Proposals (5% each) | <p>Two, one-page project proposals will be required during the semester. A rubric will be made available for further details.</p> |
| Lab Report 1 (20%) | <p>You will be required to write at least one ten-page lab report, ACS-style, on our first research project. A rubric will be made available for further details.</p> |
| Presentation 1 (5%) | <p>You will be required to give an informal, but professional, presentation on your first project in class with your lab partner (see Course Requirements/Due Dates). A rubric will be made available for further details.</p> |
| Blackboard Quizzes (10%) | <p>There will be four quizzes on the course Blackboard site (see Course Requirements/Due Dates). Your grade will be determined by the average on all of these quizzes after your highest score has been weighted twice compared to your remaining scores. These are meant to be review of key concepts pertinent directly to our work in CHM 366. You are allowed to work in groups and consult other sources for assistance, but evidence of plagiarism will not be tolerated.</p> |
| Notebook (10%) | <p>Keeping a thorough, accurate scientific notebook is essential when conducting research. Your notebook will be graded at the completion of the semester. There will be two dates for ungraded progress evaluations (See Tentative Course Schedule). A rubric will be made available for further details.</p> |
| Lab Conduct (10%) | <p>See Classroom Expectations for further details. Your behavior in lab must be completely professional. Criteria that are under evaluation include, but are not limited to: punctuality, proper lab attire, lab cleanliness, interpersonal behavior, safe lab practices, etc. I will try to provide warnings and explanations before docking this grade, but egregious violations may omit such warnings.</p> |
| Final Assignment (25%) | <p>For your final assignment you will be given the option to write a lab report on our second project (see above) or present a poster on that project at the annual Chemistry Department Industrial Poster Session held on April 27 at noon. If you do not provide me with your choice by the end of class on April 10, 2018, you will be required to write the report. If you and your partner decide to present the poster, rubrics and assistance will be provided. I reserve the right to have faculty judge your presentations and provide input regarding your performance.</p> |

Tentative Course Schedule

| Week | Meeting Date | Project | Goal | Focus | Assignments |
|-------------------|---------------|------------------------|--|--|---|
| 1 | Feb. 27, 2018 | C-linked Glycosylation | Course introduction; selection of groups; general expectations | Scientific method, data keeping, measurement and calculation | Pretest <i>(This is a voluntary attendance day)</i> |
| | Mar. 1, 2018 | | Introduction to the Problem; lab basics; basic techniques | Data keeping, measurement and calculation, lab conduct | Pretest |
| 2 | Mar. 6, 2018 | C-linked Glycosylation | Selection and beginning of experiments. Western blotting/immunochemistry | Oral and written communication; Scientific method, experimental design | Proposal 1 |
| | Mar. 8, 2018 | | Experiments: Western blotting/immunochemistry | Scientific method, experimental design | Blackboard Quiz 1 |
| 3 | Mar. 13, 2018 | C-linked Glycosylation | Experiments: immunoprecipitation | Scientific method, experimental design, immunochemistry, electrophoresis | |
| | Mar. 15, 2018 | | Experiments: immunoprecipitation | Scientific method, experimental design, immunochemistry, electrophoresis | Notebook Review 1 |
| March 19-23, 2018 | | Spring Break, No Class | | | |
| 4 | Mar. 27, 2018 | C-linked Glycosylation | Experiments: immunoprecipitation; proteolysis | Scientific method, experimental design, immunochemistry, enzyme function | |
| | Mar. 29, 2018 | | Experiments: immunoprecipitation; proteolysis | Scientific method, experimental design, immunochemistry, enzyme function | Blackboard Quiz 2 |
| 5 | Apr. 3, 2018 | MDH | Discussion of Project 1 results, Introduction to the Problem | Enzyme function and regulation; protein structure | Presentation 1 |
| | Apr. 5, 2018 | | Project Discussion with collaborators at NHCC, design and select project | Oral and written communication; Scientific method, experimental design | Proposal 2; Notebook Review 2 |
| 6 | Apr. 10, 2018 | MDH | Experiments | Enzyme function, kinetics, structure | Select final assignment |
| | Apr. 12, 2018 | | Experiments | Enzyme function, kinetics, structure | Lab Report 1 |
| 7 | Apr. 17, 2018 | MDH | Experiments | Enzyme function, kinetics, structure | Blackboard Quiz 3 |
| | Apr. 19, 2018 | | Experiments | Enzyme function, kinetics, structure | |
| 8 | Apr. 24, 2018 | MDH | Experiments | Enzyme function, kinetics, structure | |
| | Apr. 26, 2018 | | Experiments | Enzyme function, kinetics, structure | Blackboard Quiz 4, Posttest; Lab Report 2; Notebook |
| | Apr. 27, 2018 | | Results Presentation | Oral and written communication | Final Presentation |

| Course student learning outcomes | How students will practice each outcome in this course | How student achievement of each outcome will be assessed in this course |
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| Students will develop a direct understanding of the underlying theory and basic use of common biochemical laboratory techniques. | -In class lab activities -Blackboard quizzes -Lecture/discussion | -Blackboard quizzes -Lab reports -Lab presentations -Notebook |
| Students will be exposed to fundamental biochemical principles governing the behavior and properties of biological systems | -In class lab activities -Blackboard quizzes -Class lectures | |
| Students will design and execute original research projects. | -In class lab activities -Blackboard quizzes -Lecture/discussion | -Lab reports -Lab conduct -Lab presentations -Notebook |
| Students will present published and original research results. | -In class lab activities -In class presentations -Blackboard quizzes | -Lab reports -Lab presentations -Notebook |