RESEARCH – Apoptosis Techniques I and II (BIOL 442 and BIOL 443)

Mississippi College

Spring2014

Instructor: Jerry W. Reagan, Ph.D., Associate Professor
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Credit: 1 hour

Location and Time: Hederman Science Building (various labs including Hederman 202, Medical Sciences 219 and 222), various times.

Prerequisites and Background: Instructor consent.

Course Description: This is a laboratory- and literature-based research course in which students will learn about various aspects of experimental design, execution, interpretation, and presentation. Students will utilize cell culture, and perhaps, in vivo models for the study of the cell biology and physiology of apoptosis.

Student Objectives:

1) Conduct laboratory or literature assignments in a thorough and precise manner while displaying meticulous attention to detail.
2) Keep accurate and detailed records of all work conducted in the laboratory.
3) Learn to compile individual or group results and discuss the data in the context of the larger laboratory objectives.
4) Make a power point presentation that incorporates relevant literature and follow-up experiments.
5) Spend the time required to make adequate progress on your research project. As a general rule, you should spend 3 hours working on your project for each hour of research credit.

Course Rationale: This course is designed for students who wish to gain hands-on experience in the field of biomedical research. Students will be exposed to the type of environment that would exist in graduate school or full-time research laboratories.

Method of Instruction: The course will consist of at least 3 hours/week. This will include all aspects of experimental design, execution, interpretation, and presentation. It may include evaluation and discussion of pertinent literature, discussion of experimental approaches, execution of experiments, and formal and informal presentation of the data and pertinent background information.

Reading, Websites and Problems: You may receive reading assignments or be directed to useful websites or podcasts.

Lab Etiqutte: It is fully expected that you will behave in a manner consistent with the fact that you are a privileged student at an institution of higher learning that "seeks to be known as a university recognized for academic excellence and commitment to the cause of Christ." Accordingly, if you engage in activity that interferes with the attempt to promote academic excellence (either your own or that of your classmates) or is inconsistent with the mission of Mississippi College, you will be asked to leave the class and you could receive a reduction in your final course grade. You are expected to obey all laboratory safety rules and behave in a

manner that promotes lab safety and creates a positive work environment. In addition, you are expected to keep a neat and clean work area.

Lab Safety: Eating, drinking, putting on makeup (including chapstick, lotion, etc...) and/or contact lenses are not allowed in the laboratory. Also you will not be allowed to use your cell phone under any circumstances--not even for calculations--it is not a safe lab practice. Therefore, you will need a calculator. Although we will be using cells that are non-pathogenic, they still require proper disposal. Items that have not come into contact with cells or media may be disposed of in the "regular" trash. (e.g. paper). All items that have been in contact with cells (including but not limited to gloves) must be discarded in the designated waste containers in the for disposal by autoclaving. When in doubt about the disposal of items in the laboratory, the use of appropriate personal protection equipment or the experiments and procedures, just ask.

Since our research labs are BSL-2, we are responsible for requiring the use of the appropriate personal protective equipment. These items include the use of closed-toe shoes and lab coats.

The locations of the eye wash stations, the first aid kit and safety showers will be identified by your instructor. Pay attention!! The most important things you can do to be safe in the lab include (1) paying attention, (2) being deliberate with your actions, (3) thinking about what you are going to do before you do it and (4) maintaining a professional behavior in the lab.

Lab Notebook: Developing and maintaining a lab notebook is a very important skill that every scientist must develop. A common pitfall of new scientists is not providing sufficient information in their lab notebook. In the U.S., the lab notebook of a scientist can be used as a legal document to establish the "ownership" of certain scientific discoveries, technologies, drugs, and inventions for patents and in a court of law as evidence. Any future employer will expect that you know how to keep records (i.e. maintain a lab notebook). Write EVERYTHING down. Again, EVERYTHING should be written down. It should have sufficient information that if someone picks up your notebook, they should be able to perform your experiment exactly as you performed them. At a minimum, your lab notebook should include the following items:

- The date
- The name of the experiment (JWR-13-01)
- The purpose of the experiment
- Methods used (including any concentrations AND calculations for any reagents, stocks, media, solutions; which instruments are used and their settings)
- Results observed (sketches, tables, drawings belong here and file names should be listed)
- Conclusions (Put the results in context, list any changes (if any) that should be made in subsequent experiments).

All entries should be made in ink and not pencil—as you do the experiments. If you write things on a scratch piece of paper and then transfer it over, you increase the chances that you will make errors in recording. It is NOT a good practice. You should record what you will do, what you are doing and what you did (with calculations). Any mistake that you make in your notebook should be corrected by drawing a single line through the error (~~like this~~; do not erase or scratch out the mistake); in other words--the mistake should still be readable. Write everything down. Your lab notebook will be randomly checked several times during the semester. The evaluation criteria are attached to the end of the syllabus.

Original data (e.g. western blots, computer printouts, GC tracings) should be kept in a 3-ring binder and clearly identified in such a way that it can be correlated with the experiments in your nothebook.

Academic Honesty: You are members of an institution that is dedicated to scholarship and spiritual growth. This institution is part of the larger academic community, the foundation of which is based on personal honesty. The success of this community depends on the commitment of both students and faculty to this principle and therefore cheating and plagiarism cannot and will not be tolerated. More importantly, Mississippi College is dedicated to empowering its students to develop the skills necessary for "making responsible, moral choices," and therefore, the University will accept nothing less than scrupulous honesty from its students. We will follow the University policy on Academic Honesty (Policy 2.19), which can be found in the student handbook, The Tomahawk, pp. 41 – 43. http://www.mc.edu/publications/handbook/academic.pdf . **Since much of your work in this course will involve generation of data, you must be aware that failure to accurately and completely report the outcome of your experiments is an egregious act of scientific misconduct. Fabricating results or deliberate misrepresentation of others work will result in a grade of F and will be reported to the Academic Council.**

Attendance: Attendance at all functions (e.g. group lab meetings) is expected. In accordance with the attendance policy, "cumulative absences may result in a lowered grade or loss of credit for the course." Failure to attend course-related functions will reduce your final grade. Likewise, "tardiness is also subject to penalty." In the event of an unavoidable absence, *you* are responsible for obtaining missed information and notifying the instructor as soon as possible.

Student evaluation: To achieve a grade of A in this course you must successfully complete *all* assignments, participate in *all* lab functions, and meet *all* of the stated objectives. Failure to do so will result in a proportionate reduction in the final grade. To earn a grade of A you must be complete, thorough, accurate, and timely.

50% of your final grade will be based on participation:
Did you put in the required hours?
Did you participate in lab meeting (attendance and discussion)?

25% of your final grade will be based on the quality and completeness of your lab notebook – see lab notebook section (above) and grading rubric for lab notebook (end of this document).

25% of your final grade will be based on your final presentation.

Special Accomodations: In order for a student to receive disability accommodations under Section 504 of the Americans with Disabilities Act, he or she must schedule an individual meeting with the Director of Student Counseling Services **immediately upon recognition of their disability** (if their disability is known they must come in before the semester begins or make an appointment **immediately** upon receipt of their syllabi for the new semester). The student must bring with them written documentation from a medical physician and/or licensed clinician that verifies their disability. If the student has received prior accommodations, they must bring written documentation of those accommodations (example Individualized Education Plan from the school system). Documentation must be current (**within 3 years**). The student must meet with SCS **face-to face** and also attend two (2) additional follow up meetings (one mid semester before or after midterm examinations and the last one at the end of the semester). Please note that the student may also schedule additional meetings as needed for support through SCS as they work with their professor throughout the semester. Note: Students must come in **each semester** to complete their Individualized Accommodation Plan (example: MC student completes fall semester IAP plan and even if student is a continuing student for the spring semester they must come in again to complete their spring semester IAP plan). **Student Counseling Services** is located in Alumni Hall Room #4 (near

the post office) or they may be contacted via email at mbryant@mc.edu. You may also reach them by phone at 601-925-7790. Dr. Morgan Bryant is director of MC Student Counseling Services.

Lab Notebook Grading Rubric		
Topic	**Criteria**	✔
Organization (25 points)	Is the notebook neat/legible? Are there headings, a hypothesis and/or goal stated for each experiment where appropriate? Is the date noted for each entry? Are the entries on consecutive pages (without gaps)?	
Materials and Methods (5 points)	Are the materials and methods complete, clearly described and correctly referenced?	
Results and Analysis (25 points)	Have the figures and tables been included where appropriate? Were the legends, labels, keys, and titles present where appropriate? Were the observations recorded? Were the calculations complete and the statistical methods and values noted? Was the error analysis completed?	
Interpretation (20 points)	Were the results interpreted within the context of the hypothesis and the controls?	
Critical Thinking (20 points)	Were there suggestions made for future experiments? For instance, if your experiment didn't work or worked but the results weren't what was expected, did you suggest reasons why if failed or was different? Did you suggest concrete ways to improve the experiment in the event you did it again…	
Timely (5 points)	**Was the notebook turned in on time?**	