

SYLLABUS FOR SPRING 2011

BIOLOGY 302 - MOLECULAR BIOLOGY RESEARCH METHODS

Lecture-Lab: MW 12:30 - 3:20 pm
330 Foster Hall
3 Credits; Prerequisite – consent of instructors

Instructors

Donovan Bailey 261 Foster
646-7012

E-mail: prefers to be reached on dbailey@nmsu.edu but will also check blackboard from time to time.

Immo Hansen, 263 Foster Hall
646-7719

E-mail: immoh@nmsu.edu or via Blackboard e-mail

Teaching Assistant

Lisa Drake, 220 Foster Hall
646-2140

Course Goals: Our goal is to introduce students to research techniques and lab standards in molecular biology research laboratories. The skills and techniques introduced in the course will be used to reinforce fundamental concepts in biology and biological research (e.g., the central dogma, genome structure, genotype-phenotype interactions, and experimental design) and these will ideally help to make students productive member of their supervisor's lab without repetitive training across lab groups.

Grading: The course grades will be based on a straight scale (100-90 A, 89-80 B, 79-70 C, 69-60 D, 59-0 F). S/U grading cannot be applied to this course.

Participation – 15% (5% will be removed from a grade for each unexcused absence).

Notebooks – 25%

Quizzes and exercises (in class and take home) – 25%

In class presentation – 10%

Final Exam – 25%

Make-up exams as well as late assignments will be penalized (with the exception of prior permission or university authorization) at the following levels: unexcused makeup exams 25% per day and late assignments 5% per day – no late assignments will be accepted after the final exam. We will provide preliminary assessments of performance before the drop date, but we will not automatically drop students that are at risk of failing.

Course Webpage: BLACKBOARD will be the host for the course web page and for grade distribution. Please log in through <https://learn.nmsu.edu/webct/entryPageIns.dowebct> . Please inform Dr. Hansen if you experience difficulties with accessing the pages for this course. Also, note that any posting relevant for the class such as timing, location or other changes will be posted there only – it is your responsibility to log in regularly and check for information. Grades will only be posted through the My Grades feature and will not be displayed publicly.

Attendance and study: You are responsible for the material presented and assigned in lecture and lab. The course lectures and labs will be intimately linked to one another – success in the course absolutely demands attendance as well as active participation. Students who miss three or more labs without prior authorization or university authorization can lose 15% of their course grade! **As result of the time commitment being put into this lab by the instructors and teaching assistant we simply cannot offer make-up labs to students who miss class.**

Ethics: We presume and trust that you will only present your work done specifically as part of this class for evaluation. Students that engage in plagiarism or other forms academic misconduct (see <http://lib.nmsu.edu/plagiarism>) will automatically fail the course and they will be turned over to the Chair of Biology for appropriate disciplinary action in their enrolled college. **We will not overlook cases of academic misconduct.**

Students with Disabilities: If you have a disability and would benefit from any accommodations, you may wish to self-identify by contacting the Services For Students with Disabilities (SSD) Office located at Garcia Annex (646-6840). If you have already registered, please make sure that we receive a copy of the accommodation memorandum form SSD within the first two weeks of classes.

If you have a condition which may affect your ability to exit the class safely in an emergency or which may cause an emergency during class or fieldtrips, you are encouraged to discuss any concerns with your instructor or the SSD Coordinator. All medical information will be treated as confidential.

Student Supplies: For the second course laboratory and all subsequent labs please come prepared with the following supplies (each item can be purchased at the bookstore) –

1. Lab coat
2. Fine-tipped permanent marker(s) – two or more dark colors will be the most useful

We will modify this syllabus during the semester as necessary to keep with the course objectives.

Biol 302, MOLECULAR BIOLOGY RESEARCH METHODS
Course Schedule, Spring 2011

Date	Experiments	Concepts	Readings & Other Notes <i>(These will be updated as necessary in class. It is your responsibility to keep up with these updates)</i>
Mon. 1/17	Martin Luther King Holiday		
Wed. 1/19	Intro, safety, notebooks, metric system exercises, pipetting exercises		Syllabus (full syllabus is posted on BB)
Mon. 1/24	DNA Extraction	Principles of DNA extraction (cell disruption, separation of DNA, precipitation of DNA, and resuspension)	
Wed. 1/26	Electrophoresis of gDNA and PCR with universal rDNA primes	1) Principles of electrophoresis with emphasis on DNA. Polymerase chain reaction (PCR). 2) Primer Design	
Mon. 1/31	Electrophoresis of PCR product and PCR cleanup	Reinforcement of previous concepts	
Wed. 2/2	Cloning PCR products	Plasmids as vectors, restriction endonucleases, transformation (focusing on bacteria).	
Mon. 2/7	Screening clones for successful insertion of a PCR product.	DNA sequencing I – traditional methods	
Wed. 2/9	Plasmid DNA extraction and sequencing reaction	DNA sequencing II – “next generation sequencing”	
Mon. 2/14	Assessment of sequencing – contig assembly	Quality of results from a DNA sequencing reaction. Introduction to basic alignment	
Wed. 2/16	Basic blast tools and sequence alignment	Introduction to tools available through NCBI	
Mon. 2/21	Phylogenetic analysis I	Basic concepts behind phylogenetic analysis	
Wed. 2/23	Phylogenetic analysis II	Continued.	
Mon. 2/28	Sequence identification and primer design	Genome databases, Primer-BLAST	
Wed. 3/2	Malaria day	Malaria life cycle	
Mon. 3/7	RNA preps	Nucleic acid purification via Tri-reagents	Last Day to Drop with "W" Tuesday March 8
Wed. 3/9	cDNA synthesis	Principles of Reverse Transcription	
Mon. 3/14	PCR of cDNA w/ gene specific primers	Reinforcement of previous concepts	
Wed. 3/16	MID-TERM EXAM		
Mon. 3/21	Spring break		
Wed. 3/23	Spring break		
Mon. 3/28	Run gels, cut out bands	Reinforcement of previous concepts	

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Wed. 3/30	gel extract., TOPO reaction and trans	Principles of TOPO TA cloning	
Mon. 4/4	minipreps and digest	Reinforcement of previous concepts	
Wed. 4/6	gel, PCR T7 primers	Reinforcement of previous concepts	
Mon. 4/11	PCR cleanup, dsRNA	Reinforcement of previous concepts	
Wed. 4/13	clean RNA	Reinforcement of previous concepts	
Mon. 4/18	injections	Principles of small volume liquid handling	
Wed. 4/20	Diuresis assay	Principles of insect water homeostasis	
Mon. 4/25	Presentations		
Wed. 4/27	Presentations		
Mon. 5/2	FINAL EXAM, Time TBA		
Wed. 5/4		Finals	